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## THE TRAINING OF VOLUNTEER OFFICERS.

By Colonel T. STURMY CAVE.

### *Précis.*

A more general knowledge of, and interest in, the science of war amongst the officers, the best available method of improving the efficiency of the Volunteer force.

The Promotion Examinations as a means to this end.

The existing regulations on the subject and the result they have produced.

How to modify the regulations so that a much better result may be obtained.

WHETHER it be a wise policy for the country to rely so largely on an organization existing under such conditions of service as the Volunteer force, I do not propose to discuss in this lecture. As a matter of fact, the Volunteers are by far the largest portion of the troops available for land defence, and, so far as I am aware, there is no intention on the part of the authorities to alter the existing state of things in this respect. Nor is it necessary to enter into the oft disputed proposition as to whether invasion be possible, or if the navy renders us absolutely secure from any hostile landing on the shores of these islands. No amount of argument or fine drawn reasoning will ever settle it one way or the other; it has never been attempted under modern conditions, and if it were attempted and failed once, twice, or thrice, it would not conclusively prove that it would be unsuccessful the fourth time. Even those naval authorities who hold that their own Service is quite capable of preventing an invasion, will not dispute the fact that they would be better able to fulfil the

enormous duties that would devolve on them all over the world, in case of war, if they were set free from having to keep guard over the hundreds of miles of coast where landings might be attempted. They would be set free, if the land forces for defence were in such a state of efficiency as to render it certain that if an enemy did effect a landing, he would only meet with defeat on shore. No further excuse or apology is necessary for insisting that the efficiency of the Volunteer force is a matter of the first importance.

For 33 years volunteering has prevailed, and it is more popular now with the rank and file than ever before. For 33 years we have moved along in much the same groove, improving, no doubt, but improving very slowly, and without any uniformity in the general increase of efficiency; some corps are very little better than they were a generation ago; others have made a satisfactory advance.

Of schemes to effect an improvement there has been no lack; they have mostly been based on exacting more in the shape of drill attendances, and a higher musketry standard, as a qualification for drawing capitation grant. Some suggestions involve a certain amount of compulsion, others the substitution of Regular officers for Volunteers to the command of corps. Any quantity of advice has been tendered as to better methods of training. To my mind the only one of these various propositions that even touches the root of the matter, is that which treats of the substitution of Regular officers for Volunteers in the more responsible positions, and, with all due respect, I venture to disagree entirely with this, for reasons I will give later on.

The effect of raising the so-called conditions of efficiency may possibly land some corps in financial ruin, but the chief danger of it would be that if any increase of the number of attendances at drill were laid down, in such a degree as would substantially improve the man who is satisfied with the present minimum, say by making the attendances 25 instead of nine, this revised scale would probably be looked upon as the maximum as well as the minimum; as a matter of fact, as it stands at present, the regulation number is not regarded as the standard to be aimed at, and I believe it is the case in most corps, it certainly is in mine, that the average number of attendances is four or five times that now required to earn the capitation grant. Again, to raise the capitation requirement in musketry is not the way to improve the shooting of the force, to fine the commanding officer 25s. or 35s., and refuse any ammunition, does not help him to teach the young Volunteer to shoot better the year after he has failed to pass out of the 3rd class.

The true basis on which the efficiency of the Volunteers, like every other military force, must rest, is in the capacity of its officers to lead and command. I will venture to quote a few words of the greatest military genius of our times, at least I suppose it is not wrong in attributing to Von Moltke himself, the regulations contained in the "Order of Field Service of the German Army." In this work it is laid down that "as the officer is in all matters the soldier's instructor and leader, he must be superior to him in knowledge, experience,

and strength of character. Without shrinking from responsibility, every officer, in any situation, no matter how extraordinary, must carry through, at all costs, the duty in which he is engaged, without waiting over every detail for an order.

"The personal bearing of an officer is of the greatest consequence, since his coolness and determination are reproduced in the ranks. The mere issue of orders is not sufficient; the manner in which an order is given has a great effect on subordinates. Bearing and example encourage confidence in troops, and incite them to actions which ensure success.

"The numerous and responsible tasks which fall to the lot of officers, require that special care should be given to secure thoroughness in their professional education. . . . *But good officers cannot be formed unless they incessantly labour to self-educate themselves.*"

It may be thought that, if so high a standard as this is to be set up, it is beyond anything that can be expected of Volunteers, and, therefore, the only solution is the appointment of Regular officers to the Volunteer force, this I have already stated to be, in my opinion, wrong. It is not open to question that retired Regular officers often possess the power of command and leading in the field to an extent that very few Volunteer officers have attained under the existing want of system of instruction, but, in spite of this advantage, the retired Regular officer has by no means always proved a success as a captain or field officer of Volunteers; nor is this at all surprising when it is remembered that the whole system of administration and control to which he has been accustomed, and which has become a part of his nature, is different; true, the object to be arrived at is the same, viz., smartness and discipline, but the means provided by the regulations and conditions of service are dissimilar in every respect.

It may seem a paradox to say that the officers are the weak part of the Volunteer force, and at the same time to maintain that it is essential to the efficiency of the force that it should continue to be officered by Volunteers, experience, however, proves it to be true; the solution of the difficulty will be found in the better instruction and education of those who hold commissions in the force. If these are rendered more capable of command and leading, possessed of more confidence in themselves, and able to inspire more confidence in their men, then those corps will be the most efficient that are commanded by men who have served in them as subalterns, and have passed through every grade of the commissioned ranks until they have attained the command; they will thus be acquainted with all those under them, with the peculiar circumstances of each company and individual, and with the capabilities and possibilities of the force.

The question is, how is this improvement in the Volunteer officer to be effected? The answer I submit for consideration is, by means of the promotion examinations.

It is true that these examinations have been open to officers of Volunteers for some years, and, so far as tactics is concerned, the

privilege has been to a considerable extent availed of; to this fact may reasonably be attributed the improvement that has taken place, and that is going on, in an increased ratio as the number of those who pass becomes larger. Even in this respect acceleration is wanted, while in the other subjects, although they have been open to Volunteers for five years, the results are very insignificant. When I brought this matter forward at a general meeting of commanding officers last year, one commanding officer asked what the promotion examinations were, and I am rather mistaken if he was the only one in the room who was not a little in the dark on the subject.

As many may read this paper when it is published in the Journal of this Institution who will not at once recognise what is meant, I will explain that the promotion examinations consist of those subjects classified in the Queen's Regulations under the headings (c), (d), and (e), Section 9, p. 237, viz., Military Law, Tactics, Field Fortification, and Topography for all arms, and a special examination in artillery for officers of that branch of the Service. For the conditions under which officers of Volunteers are permitted to enter, and other details, the Volunteer Regulations, paras. 356 to 365, must be consulted, also Appendix IX, and the Queen's Regulations, Section 9, and Appendix VII.

A special paper is set for artillery officers, in accordance with the particular arm with which they have to deal, but with regard to tactics, military law, field fortification and topography, subalterns of Volunteers have the same paper that subalterns of the Regular forces have to pass before they can be promoted to the rank of captain; captains of Volunteers, and all above that rank, are permitted to enter for the same papers as those set for captains of Regulars before they are promoted to the rank of major.

The measure of encouragement that the regulations provide to induce Volunteers to enter the lists is, that in the event of a subaltern passing in tactics an indication is given of the fact in the Army List by (t) being placed after his name, and after the names of those who pass the captain's paper (T); in like manner, the successful artillery officer obtains a distinctive (A); in each case the funds of the corps to which the officer belongs reap the advantage of an additional capitulation grant on his behalf of 30s. per annum. For the other three subjects there is no distinctive mark and no additional grant; this certainly explains, to a large extent, the contrast that the following figures disclose.

The first examination in tactics open to Volunteers was that in January, 1883, when 125 were successful; on every occasion during the subsequent 11 years, numbers varying from 30 to nearly 200 presented themselves before the examiner, with the result that there are now serving over 1,200 who have passed. In artillery subjects the Army List shows 212 as having been successful.

But when we come to the other subjects for which no encouragement is given by the regulations the result is very meagre indeed. Military law, fortification, and topography have been thrown open to the Volunteers since May, 1889. After five years the result is as

follows: there are 11 officers now serving who have passed the captain's papers in all three subjects, and 1 subaltern; 8 who have passed in two of the subjects, and 39 in one only; that is a total of 60. It may be mentioned that, with very few exceptions, these 60 officers have passed in tactics also.

There is a certain school that depreciates the value of examinations, but I hardly suppose that even this school would go so far as to assert that technical knowledge is of no value to an officer, and it is quite certain nothing is so likely to induce men to acquire that knowledge as an intention of having it tested before an examiner. With reference to tactics, I feel sure that the encouragement given to take up this subject has been one of the best things that has ever been done for the efficiency of the force. For many years there certainly existed a general impression that a knowledge of drill was all that was required, or desired, to make an efficient officer; very few of us among the Volunteers realized that drill was but a means to an end, that end being the discipline of habit so far as the rank and file are concerned, and the means to enable the officer to take advantage of his knowledge of tactics in the field and to bring his troops to the right place at the right time and in the right formation.

In reference to field fortifications, we are often told that the place for the Volunteer force is behind earthworks; without for a moment agreeing that this is the only way in which it is capable of being used, there can be no doubt that the spade will play an important part in future wars, even according to the latest authorities in the attack; is it not, therefore, of great importance that officers of Volunteers should have some knowledge to guide them, that they may be able to instruct their men how to use the spade? It is quite certain there will not, in case of an emergency, be available an officer of the R.E. for every company, or even battalion, of Volunteers; the knowledge gained, therefore, in studying field fortifications could but prove of the utmost value.

Some knowledge of topography is necessary for map reading, even junior officers of Volunteers are sometimes called upon to take charge of the point of an advance guard or to post a picquet, neither of these duties can be properly performed without a knowledge of map reading; beyond this, if the subject is studied, a certain number of officers are sure to develop a taste for map making, and this would, undoubtedly, prove of value in the hour of need; without some knowledge of topography no officer can be said to be thoroughly efficient in tactics, for the two are at some points inseparably connected.

Lastly, Military Law. There is, perhaps, less necessity for Volunteers to be versed in this subject than in either of the others, but there are many occasions in which it is useful, even in times of peace, and if the force were called out it would be subject to all the provisions of the Army Act, and if a complete state of ignorance prevailed with respect to it, the greatest inconvenience would result; besides, there is this to be said, it is the easiest of all the subjects to pass, and as a large portion of the officers of Volunteers are

already lawyers by profession very little study would enable them to satisfy the examiner.

There are also indirect advantages to be gained by the study of text-books and the passing of examinations, the student is led to the reading of military history, he becomes deeply interested in battle of the past, he learns how the axioms laid down in the text-book for his guidance have actually operated in the field, the art and science of war grows upon him, and he becomes a better soldier, with more confidence in himself, and, what is of still greater importance, able to inspire his men with greater confidence in him.

To encourage officers of Volunteers to qualify themselves for the grave responsibility they incur in undertaking, as they do, to lead men in battle if the necessity arises, a modification of the present regulations is urgently wanted. First, in reference to tactics, there is this weakness:—Of the 1,248 who have passed the examination no less than 641, although they have risen to the rank of captains and field officers, have been content to rest satisfied with the subaltern's certificate; for this the regulations are largely responsible. At one time a certain percentage of marks entitled the candidate to a special distinctive mark in the Army List, indicating that he had passed with honours. These distinctive marks are done away with for the future, but of the 641 captains and field officers mentioned no less than 106 obtained it, and it is easily comprehensible that they do not care to go in for the captain's examination and thereby sacrifice the honourable distinction they have won.

There is, however, another cause which operates against those who have passed as subalterns taking up the paper for captains; the grant that is earned for the corps is not increased if they are successful, it being the same (30s.) whether the officer has passed the subaltern's or the captain's standard. This might well be amended by reducing the grant for a subaltern's pass to 1*l.*, and increasing that for a captain's to 2*l.*; the immediate effect of this would be that the actual amount payable under this head by the Government would be reduced to the extent of 280*l.* Such a suggestion will no doubt alarm some of my brother commanding officers, but the matter should not be regarded as a financial one at all; moreover, a portion of the small surplus thus created can at once be appropriated under another head. As already stated, there is not at present any grant at all for passes in military law, fortification, and topography; these certainly ought to be put on the same footing in reference to grant as tactics, that is 1*l.* for a subaltern's pass in each and 2*l.* for a captain's; this would, as the matter now stands, absorb 176*l.*, leaving an advantage to the exchequer of about 100*l.* to be turned to an advantage to the Volunteer funds as soon as 50 more officers had passed.

These small allowances are not to be regarded as of importance from a financial point of view, the amount earned by the officers of any one battalion is too insignificant. Even with the alterations I advocate here, it is unlikely that any battalions would obtain more than an annual allowance of 70*l.* or 80*l.* for these passes; even if they did, how would it be possible to devote a few thousand pounds

of the country's wealth to a better purpose, or what portion of the grant to Volunteers would be more likely to tend towards thorough efficiency?

It has been sometimes advocated that, so far as the examination in tactics is concerned, it should be made compulsory in the Volunteer force, as it is in the Regulars. I do not agree with this, except, perhaps, so far as the promotion to the rank of field officer is concerned; there are two dangers to be apprehended, from attempts to graft compulsory examinations on to a voluntary and unpaid military system; it is argued by some that if examinations are made compulsory, the standard of efficiency will thus be raised, and better men will thus be attracted into the commissioned ranks; as a matter of fact, indolence and self-indulgence are among the chief reasons that deter young men of the right class from becoming officers of Volunteers; so far as the certain prospect of several compulsory examinations inducing them to throw off their lethargy, there can be little doubt it would have a contrary effect, and render it still more difficult to obtain officers. Another reason for non-compulsion is that, so long as the examinations remain voluntary, there will be no temptation to lower the standard required for a pass; if it were laid down that, before promotion to the rank of captain, an officer of Volunteers had to pass any or all of the promotion examinations there would be a tendency on the part of good-natured Boards to let the candidates through on easier terms. Such a tendency certainly exists in reference to the compulsory proficiency examinations in drill, and it is not to be wondered at that many commanding officers have a good deal of sympathy with the practice, seeing that the consequences are so serious if the candidate fails. Owing to the tendency here alluded to, it has been suggested that the privilege of passing the proficiency examination before a Board should be abolished, and all Volunteer officers compelled to attend a school of instruction, or at least present themselves before the commandant of a school on the last day of the course, and there be subjected to the same final test as those that have just completed the month's course. I am not quite sure that this would prove the best method; an alternative plan would be to introduce into the regulations for the guidance of Boards, conditions that would ensure the test being as thorough as that prevailing at the schools.

The utmost, then, that I would add to the compulsory examination would be to render the passing in drill before a Board as thorough a test as it now is to pass at a school, and to require a captain to pass in tactics before promotion to field rank, and I will suggest, more as a subject for discussion than as a recommendation for adoption, that at this stage, namely, for a captain before promotion to field rank, a paper in subject (a) regimental duties might be required; the syllabus for this would have to be compiled to comprise the essential features of the Volunteer and the Queen's Regulations so far as they apply to the discipline and economy of Volunteer regiments. This suggestion is thrown out, because I have often found that, even in the senior ranks, there exists great ignorance as to the

powers of officers and the proper practice in all that relates to the economy of the force.

For all other examinations, strongly as I advocate officers of Volunteers going in for them, their doing so must remain purely voluntary. They must be induced to do so by encouragement and not compulsion. The only two sources of encouragement that are known to us under the present Regulations are the money grant to the corps funds and the distinctive mark in the Army List; if these are somewhat revised, it will probably go a long way towards the desired end.

With regard to the capitulation grant for these passes, I have already stated that what I propose is, that the amount to be earned in each of the four subjects should be 1*l.* for a subaltern's pass and 2*l.* for a captain's, which would be the means not only of inducing the subaltern to enter the lists, but to go in again for the captain's paper when he obtained promotion to that rank.

It is a more difficult matter to devise what should be done in reference to the distinctive mark in the Army List against the name of the successful candidate. That there should be some such indication for a pass in all voluntary examinations, is only a reasonable demand, and the distinction conferred by the indication, at the same time, forms one of the most popular encouragements to induce officers to make the attempt, but, at the same time, any ostentatious display is not in good taste, and, I am sure, not desired by the Volunteers themselves. Already we have quite enough, when it happens that an artillery officer has passed in the artillery examination, signalling, and tactics, besides having taken his proficiency certificate at a school, for which he has the letters p.s. appended to his name. It is difficult to understand why the compulsory examination in drill requires any indication at all; the only justification that can be suggested is that as the pass taken at school is really of value, and the pass before a Board is not, therefore there should be a distinction between them, but if, as suggested already, the latter is brought into line with the former, then there can be no reason at all for retaining these letters, the date of an officer's commission will show whether he has passed the compulsory examination in drill, without which the regulations already provide that he cannot retain his commission for more than two years (para. 78). All the letters p. and p.s. may, therefore, be very well wiped out of the Army List, and if this be done, it will not be too much to ask that an f. should be granted for fortifications, an r. (reconnaissance, as it is often called) for topography, and an l. for law, but, in the event of any officer passing all three of these as well as tactics, in order to prevent the multiplication of letters beyond its present number, a single letter p., in old English, might stand for them all; in every case, a small letter for the subaltern's pass, and a capital for a captain's. I am afraid this looks a little complicated, but it is not really so; it would not, in any instance, increase the numbers of letters that can be, and are, attached to the name of a Volunteer officer under existing regulations, and, as a matter of fact, it would very much reduce the existing aggregate. I claim, therefore, that the scheme avoids the error of any ostentation in this

respect, and merely provides for a recognition that can fairly be claimed for that which is done voluntarily, and which will make so much for the efficiency of the force.

If officers of Volunteers are to be encouraged on the lines suggested to render themselves really fit to fulfil the duties which would devolve upon them in case of emergency, it is desirable that greater facilities should be given them for the study of the subjects comprised in the promotion examinations. At the present time nothing is provided by the regulations, occasionally D.A.A.G.'s for Instruction are kind enough to permit Volunteer officers in their locality to attend their lectures, but, as these are invariably in the morning, it is not possible for more than a very few to avail themselves of this privilege. Some tactical societies endeavour to arrange courses of evening instruction, but these efforts are uncertain, and only capable of rendering assistance to those residing in the neighbourhood of two or three of the large centres of population.

What is wanted is a school of instruction, organized much on the same lines as the schools for drill at Aldershot and in London. These have been found invaluable to the officers of the Auxiliary forces, and the time has surely arrived when it should be recognised by the responsible authorities, that the officers training, even in the Militia and Volunteers, should not stop at drill, but be carried on to the higher branches of the science of war, without a knowledge of which it would be madness to attempt to meet such troops as we may expect an invading army would certainly be composed of.

I am indebted to a staff officer of much experience for some suggestions with regard to the formation of such a school. With reference to the locality best suited for the purpose, he is of opinion that Aldershot possesses many advantages; there are, no doubt, disadvantages, in that the surrounding country is somewhat stereotyped and too easy for the solution of tactical problems; yet, on the other hand, it is varied, there being both close and open districts available, in addition to which the opportunities of occasionally attending field days would be useful and attractive to officers of the Auxiliary forces, a certain amount of fraternization with the officers of the Regulars would be involved which would prove an inducement to attending the school, while the association for such a purpose would react beneficially on the Regular officers themselves, who should be encouraged in their spare time to attend the lectures, discussions, and outdoor work of the school. His suggestions for the method of instruction are that it should in all respects be practical, and almost entirely out of doors. Drawing and writing, except for very brief military reports or practice in orders, not to be insisted on. The outdoor work to be similar in character to that which has been recently conducted under the auspices of the Home District Tactical Society at Arundel, supplemented by lectures and discussions after mess. He believes that it would be almost essential to the successful working of the school that a mess should be established.

He is of opinion "that the only special appointment that would be necessary would be a five-year commandant, with the style, though

not necessarily the pay, of an A.A.G., to be assisted by the D.A.A.G.'s for instruction, who would be told off in rotation for the purpose when the garrison courses were not going on, at which time the A.A.G. would be employed in ordinary staff duties, and the class for Auxiliary officers suspended." This course is, I believe, suggested with the object of saving the public expense; but, to my mind, the matter is of so much importance, that the very small cost of an independent staff, with both commandant and his assistant appointed for five years, may reasonably be asked for, and it would moreover be essential that the classes should not be suspended for the two months previous to the examinations, for I regard it as one, if not the chief, object of such a school to prepare officers for these examinations.

The courses might be made so that any officer attending for one month might have an opportunity of getting up tactics and one other subject, field fortifications and topography running alternate months, and tactics always. It is, I think, hardly necessary that law need enter into the course at all, it being a subject that officers can work up at home by the aid of the prescribed manual on the subject.

Officers of the Auxiliary forces should be invited to attend the proposed school on the same terms as they are permitted to attend the schools of instruction for drill, the allowances being dependent on their passing the examinations next ensuing, the course to be for one or two months at the option of the student, and, if for two, not necessarily consecutive, at least one examination to be passed for each month at the school to entitle the officer to draw the allowance.

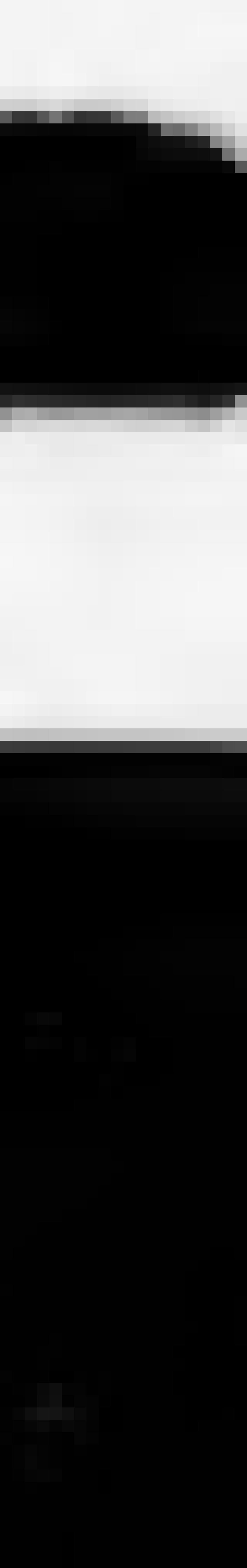
In conclusion, I venture to express a hope that these suggestions may not be considered unworthy of consideration both by the authorities and the officers of the Auxiliary forces. They are made with a sole intention and earnest hope that the progress towards efficiency, which I am certain is going on, may be accelerated. To my brother officers in the Volunteer force I would like to add that there is no occasion to wait for any alteration in the rules and regulations; whether they care to face the examinations or not, under the present rules, they can at any rate do their best to study the science of war; they can, if they will, make more use of the facilities already available. We should remember that we have undertaken the most serious duty that can devolve on us, in that it is possible that we may be called upon, with little or no warning, to go into the field with the lives of our men depending on our efficiency. If we lack the necessary knowledge in the hour of trial, having neglected to learn in times of peace, the consequence may be the loss of those lives. The probability is perhaps remote; let us hope it is, but our very existence as Volunteers shows that it cannot be regarded as altogether impossible.

Colonel ALT: We are very much indebted to Colonel Cave for bringing forward the question of the training of Volunteer officers. I agree with a great deal which he says, particularly in regard to its being altogether undesirable that retired officers of the regular forces should be appointed to the more responsible positions in the force. I believe there are a large number of zealous and

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efficient officers who look to the prospect of high command as a reward for long years of hard work and expenditure in the lower ranks, and if that incentive were withdrawn, it would be more difficult than it is at present to obtain officers for the force. With regard to examinations, there is one thing which lies at the root of the matter, and that is the difficulty of getting officers. Some of us are able to keep our commissioned ranks fairly well filled, but it is notorious that the great difficulty we all, more or less, labour under is the paucity of applicants for commissions. Of course if there were a waiting list in every corps, it would be easy to impose regulations with which candidates would have to comply before attaining a commission, or before promotion. I consider that the distinguishing marks in the Army List against the names of those officers who have passed special examinations with honours should be retained, as well as the letters for passing schools of instruction and drill. I do not agree with Colonel Cave in thinking that any rules that could be laid down for the guidance of Boards could possibly insure as satisfactory an examination of officers as that of a school of instruction. To my mind whatever rules were laid down, officers would manage to scrape through, and get the small "p." to their names, and certainly it would not in any way be equivalent to the examination, or rather training, which they go through at schools of instruction. I think greater facilities should be offered to officers to attend schools of instruction in drill, and that evening schools for the purpose should be established. With regard to the amount of grant, Colonel Cave's remarks lead one to think that he has been in communication with the Chancellor of the Exchequer, because he is so very careful that the small amount of money now allowed for examinations should be not increased but reduced. I do not think any officer goes in for an examination for the sake of the 30s. grant, and it makes no appreciable difference to the funds of a corps. So far from reducing the paltry amount of the present grants, I should be inclined to increase them, and leave it to officers commanding corps to allow officers who earn such grants to retain the amount towards their corps subscriptions. In this respect I am not in accord with Colonel Cave, but upon the subject of schools of instruction in tactics, &c., I am entirely with him. I think the idea is an excellent one, and might certainly be carried out, always provided that these schools could be arranged for evening as well as day instruction. But I repeat that what really lies at the root of the matter is the difficulty of getting officers at all. All commanding officers are obliged to be very tender as to how they deal with officers. If they put on the screw, they may very easily drive good officers out of the ranks. We have all a certain number of keen and zealous officers who go in for examinations, and attend the work of tactical societies, but if we retain only those officers in our ranks, and drive out, as we should very often like to do, those who do not make themselves thoroughly efficient, we lay ourselves open to the reproach that our commissioned ranks are not filled, and our battalions are looked upon as battalions not being as efficient as they might be, whereas we should really be more efficient with a few officers well qualified than with a larger number less efficient.

Major A. D. SETON: It seems to me that the first speaker hit the nail on the head when he said that what lies at the root of the whole thing is the difficulty of getting officers. I am quite convinced that that is the case. My experience is a tolerably wide one of country corps—I do not pretend to know anything about London corps, which are somewhat different—but I have been thrown in contact a good deal with Volunteers in the north, near large towns, where there are several regiments in each town, and I must say that in almost every regiment you find three or four fellows, as the first speaker said, who go in for everything, but the great majority are drones. I am a pretty regular attendant at the Tactical Society's lectures, and so on, and you always find the same men at every one of them. In the War Games it is just the same: the same 20 or 30 men turn up time after time, and the great bulk of the members never come near the place. They merely pay their subscriptions, and not always that, perhaps. At any rate they do not attend, and it seems to me that the only way to remedy this is to make it worth a man's while in some sort or way to make it a distinction to him to belong to a Volunteer corps. That is at the root of the whole thing. There is so much cycling and lawn tennis, and one thing and another



now, that men are naturally taken away—they get much more fun out of those things. They can get "their sisters, and their cousins, and their aunts" to play tennis with them, or go on the river, or even cycle with them, but they cannot take them to Volunteer things. And then, again, their wives and aunts and cousins and sisters very naturally object, and say, "You are always out at night, when you might be at home." They are mostly men in business all day long, and the evening is the only time they have, and therefore I do not think it is altogether fair to say that it is indolence and self-indulgence that is at the root of it. It is hardly that, I think. There is certainly not much self-indulgence about a man who goes in very strongly for athletics; he is very self-denying as a rule. It does not matter what branch of the Service it is, I am afraid the great bulk of the officers will not incessantly try to deny themselves unless they are going to get something by it. Take any regiment you like in the army, you find a certain number of men who go to the Staff College, or go in for various subjects, they always expect to get a *quid pro quo* in the end; they do not go in for it for the fun of the thing, and it is the same thing with regard to Volunteers. There are a few enthusiasts who go in for these things, but the majority ask, "What is the good of doing it? There is So-and-So who does not go in for them, and he is just as likely to command the regiment as I am." I think myself that any amount of letters after one's name, which are all excellent in their way, will not touch the real root of the question. It must be made worth a man's while; you must make him feel that he is, and not only make him feel it, but make it appear in the eyes of his fellows that he is, somewhat better than the general run of men by belonging to a Volunteer corps. By doing that you get the whole thing at once, and until that is done I am afraid these things are merely playing with it. With regard to the schools of instruction, they are excellent things, but so very few men I find in the north of England can spare the time to go for a month; as a rule young men when they join the Volunteers are in offices, or in a business of some kind, and are rarely in business for themselves, they are generally in somebody's employ. I do not know how it may be in London, but in the north of England the usual commercial holiday is about a fortnight, and that is all that the junior clerk is expected to get. If he takes more, unless he happens to be a favourite, or has some influence, he gets very black looks indeed, not only from the employer, but from the other clerks, or whoever may be associated with him. That regulation, which I think is still in force, enabling a man to go to the school for a fortnight, and then go for a second fortnight, seems to work very well. It has enabled many a man to go to the school who otherwise could not have gone at all, and I think if anything is done in the way of a school, something of that kind should be brought in also. With regard to compulsory examination, it is perfectly certain that a compulsory examination would not make more men go into the Service, but, as Colonel Cave says, it would frighten them out. There are lots of men who talk in a vague sort of way about it being a good thing to make examination compulsory, but they do not really consider the subject. What we must do if we are really to do any good, to make the thing a success, and to educate officers as they ought to be educated, is to strike at the root of the thing; make the men who belong to a Volunteer corps appear better in the eyes of their fellows than those who do not.

Captain LOUIS TEBBUTT: In trying to find out what is to be done to train us to a higher pitch it is worth while considering what deters us now. The most important thing that deters Volunteer officers going beyond a very limited amount of drill is the inspection itself. We are inspected in a few battalion movements, in a formal attack, we are told that we are very satisfactory, and we all go home congratulating ourselves. An officer does not feel that it is necessary to learn very much. He can manage to command his company in a battalion, and he does not think that the authorities expect any more from him than the inspection shows him to possess. By a gradual tightening up of the inspection, making it more realistic, testing more the practical knowledge of the officers, you would gradually increase the efficiency of Volunteer officers. The second thing is that we Volunteers ape or copy the Regulars—what we think the

Regulars do, we try to do—as long as it appears to us that the Regulars are not professional or do not wish to appear professional, so long will the Volunteer officers try not to be professional. Fortunately our brothers in the Regular army are now more professional and take more interest in their work than they used to do, and no doubt that will in time react on the Volunteers. Thirdly, we have so few opportunities. I speak as a junior company officer, and perhaps being last from school appreciate the difficulty of teaching and training myself more than some older people. When I take my company out I have more than enough to do to teach them, when I attempt anything beyond a little squad and company drill, and as for trying to teach myself, and studying simple tactical problems, it is impossible. If one wants to learn the practical leading of a company he must try to learn it away from the Volunteers and learn with men who are already properly trained. Fourthly, there are very few inducements. There is little money, or *kudos*, to be earned for your corps, and if you are very keen you are looked upon more as a nuisance than otherwise. I do not believe, unless the whole method be changed in some way or other, that an officer of Volunteers will advance much beyond his drill, unless he is an enthusiast, or makes that his hobby in life—he must throw his cricket and football aside and put all his surplus energies into studying military work. I also think there is a very great gap in all Volunteer training. We learn a little drill, and then some of us go in for the War Game, study higher tactics, strategy, and all sorts of things, when probably we can hardly command our company on a simple field day. I should like to see beyond the drill examination a simple examination arranged and made compulsory. I believe by making it compulsory, it would give officers very much greater interest in their work, because now they remain at the uninteresting portion, viz., drill, whilst if forced to learn a little of the practical work they would find there was something beyond drill far more interesting. I would suggest that this examination should include a certain amount of field fortification, and map reading, very little sketching, hardly any military law, and just a little practical minor tactics. This should be a minimum for company leaders. In addition to the school that Colonel Cave advocates there should be a school arranged for helping officers to pass this exam., based on the month that is now devoted to military training by a company in the army—that is a very good basis to work upon, and certainly I have learnt more in the month that I was fortunate enough to be attached to a company with the Regulars struck off for military training than in the whole of the work that I have done otherwise. I wish all Volunteer officers could go through the same, as I am perfectly certain they would appreciate then the great gap that now exists in their training, viz., between drill and higher war games. Outdoor tactical exercises, book reading, and paper examination do not practically teach you how to lead your company across country, or to make use of the wonderful arms that are put in the hands of the men. A month spent with a company of Regulars with a good captain putting his company through military training will, however, teach one something toward making Volunteers not mere paper officers, but men who can apply their common sense to leading their commands in war.

Colonel WILDE: *I cannot agree with Colonel Cave in doing away with the p.s. and the p. in the Army List, because these letters show that an officer has acquired drill knowledge, and I am afraid the two years he speaks of is not strictly adhered to, and there may be many field officers in the Army List who have been there more than two years and yet have not qualified themselves for the position they occupy.* Therefore I think it is an encouragement for officers to find they do get noted for having done something. The school, of course, is the most valuable and important thing we can have for training, and it would be very desirable, I think, if a school could be held, especially in London, as it has been on some occasions, in the evenings, which is a time that suits many of those who wish to attend. Most of our officers, certainly in the junior ranks, are in some employment, and if they could have their drill in the evening, I think it would be a very great assistance. It has always struck me that there should be some small allowances for an officer who gets attached for drill purposes to a line battalion. He could do his drills early in the morning, and if he satisfied the adjutant

or some proper officer at the end of the time he might get some small allowance. I remember on receiving my first commission, in 1861, I drilled with the Guards at six o'clock in the morning for something like six weeks. I shall never forget the training I got then, and I think if it were recognised that an officer might be attached to a Regular regiment and might go at an early hour in the summer time he could get instruction which he never could obtain otherwise, and it would be an encouragement to him if he could get a certificate, and an allowance, he would be quite qualified to sit afterwards for his p. I think you can always tell the difference between an officer who passes a p. and one who passes a p.s. I think the p.s. polish might be put upon him if he could attach himself to a line regiment for month, or as long as he likes, and have an allowance. I cannot agree with the suggestion that an officer should receive personally the allowance he earns for his corps. I think that is a system which would not answer at all. Officers take an increasing interest in their work, and they feel it is a return if their regiment gets something for the labour they have given to it. As for Colonel Cave's remarks about tactics, I think that the first examinations were held in July, 1882, and not January, 1883. I sat for it myself, and I think in the first examination we could only pass as lieutenants. Some years afterwards another examination was held which was of a different class, and I think those officers who got all they could when they went up at the first time could hardly be expected to sit again under new regulations. I think we are very much indebted to Colonel Cave for the trouble he has taken in the matter. There are many points in the paper which are of interest, and I hope they will help us in getting our officers more perfect, and also in keeping them together, because we have to combat with field sports. I think it is much better to tell the officer he *must* pass in drill, and he will gradually give a little more time from his cricket, &c., to go into tactics and other extras. I do not think we should make the examinations more compulsory than they are now.

**Captain ASTON-LEWIS:** What I wanted to call attention to has been already put before the meeting by Colonel Alt. Colonel Cave says, "All the letters p. and p.s. may therefore be very well wiped out of the Army List." I quite agree with regard to the letter p., but with regard to the p.s., with all deference to Colonel Wilde, I do not think that any mere examination can be a sufficient substitute for the month's course at the School of Instruction, nor that any system of training for Volunteer officers can be founded on the assumption that p.s. is unimportant. I am sure that all those officers who have been to Wellington or Chelsea Barracks will agree with me that no amount of what Colonel Cave quotes as "educating ourselves" can really take the place of the careful instruction we get there from those who are probably the best drilled soldiers in the world. I wish merely to protest against that, and to suggest that the remedy would lie in increasing the facilities, not merely by evening classes, but, if possible, by having schools at other centres. In the old Volunteer Regulations we find that there were four or five centres for drill instruction, including Glasgow, York, and I believe Plymouth; if there were some system by which officers could go to a school without necessarily coming to London or Aldershot it might, I think, facilitate the training of many who are now prevented by business engagements from attending. Surely it would not be too much to expect that an officer should be compelled to pass a school before attaining to field rank, even if the lower school were not compulsory. As the captain's certificate is not carried up in promotion, the officer no longer ranks in the Army List as having passed a school. Yet there is very little pressure put upon field officers, I fancy, to go in again; and, as far as the Regulations go, there is one point that really is a discouragement, namely, that captains are fined if they presume to go in for the field officer's certificate before promotion, which seems to me to be manifestly unfair. They used to be allowed the grant for the fortnight at the same rate as in passing for the captain's certificate, but now if we go in as captains for the field officer's certificate we get no grant at all, but have to do it absolutely at our own expense. Surely it is better that an officer should qualify before promotion than after.

**Brigadier-General Lord BELHAVEN AND STENTON:** I only wish to make two or three short remarks about this interesting paper which Colonel Cave has given us.

Colonel Cave I think says, and it is not unfair to say that perhaps the weakest point of the Volunteer Forces is the training of the officers, and, in my opinion, the weakest point in the training of the officers is their tactical training and their tactical manœuvring in the field. No amount of examination, and no amount of theory, and no amount of War Game will make up for the want of training in the field. Therefore, if that is the weakest point, the object should be to see how we can improve it. As to examinations, however small may be the requirements, every officer ought to pass some minimum examination before he is promoted to another rank, because what he may have learnt as a subaltern and crammed up at a school he may have forgotten. As to the tactical instruction, it seems to me that you wish to diffuse it as much as possible, and therefore the plan that I think would be most successful would be that you should decentralize a little; and at the headquarters of every military district collect all the Volunteer officers together who could go out for a fortnight during the autumn; and get these into pretty large classes in which they should, under Regular officers selected for the occasion, go through a course very much (as another speaker has said) like a company going through its military course. These officers should be formed into a company under a captain and a couple of subalterns specially selected from the Regular Army. Volunteer officers would then have to learn to do what sergeants, corporals, and privates have to do, in every detail; and they would find this a great assistance when training their own men. Such a training as this (which is very similar to that which we have all had in the Regular Force when first learning our duties) would, I think, have a most beneficial effect.

Captain F. H. HOSKIER : I think the whole gist of the matter is really based on the regimental training of the officers, and that of course, is the great difficulty in the Volunteer Force, to get people together to begin with. That is one of the worst things that a company officer has to contend with, and if he cannot instruct his men he certainly cannot instruct himself. In barracks you can get hold of them, but we have to send postcards, &c., to them, and sometimes the postcards are returned "Gone away." With regard to the time of drill, I think that might be lengthened further, and instead of an hour or an hour and a quarter, as it is in my regiment, if possible made *two hours*. Many of my men knock about afterwards, and talk and chat, so that to a very large proportion of them the extra half hour or three-quarters of an hour would not, I think, be of any pressing account. If one could get the drills of a minimum length of two hours it would be a great help towards the regimental training of officers as well as the training of the men. The two, of course, go together. With regard to allowing the grant for Volunteer examinations to the officers themselves, I know that it is practised in one of the Scotch regiments. One of our own officers who was formerly in this corps told me that it was the practice not to *give* the grant if they earned it by examination, but to deduct the amount earned from their annual subscription; and certainly, I think, this would be an inducement. One speaker has said that one great difficulty in getting Volunteer officers was the time. I must say I never found the time interfere with it particularly myself, I have always had plenty of time for other games, and if the days are not long enough we have been told by Tom Moore that—

"The best of all ways to lengthen one's days  
Is to steal a few hours from night."

With regard to the inspection of the officers, I think if inspections were carried out in a different way it would be advantageous. At present an inspector comes down for inspecting gun drill, as in the case of an artillery regiment, and one knows beforehand exactly what he is going to say and do, and therefore it is really no real test of the efficiency of the regiment, but if the inspector was to pop down at all sorts of unlikely intervals and really to see the work as it goes on, the officers would be far more interested in showing the inspector what they could do.

Captain M. H. GORMAN : Although I quite agree that the school instruction is an excellent system, and also in the abstract for tactics, I think it should be on the lines of the company field training in the Red Book; the great difficulty with the

Volunteer officers is the little interest they sometimes take in technical subjects. If they are encouraged to take an interest, that interest would grow. The object of all examinations is to induce officers to study, and if you get officers to study the mere fact of their passing an examination is, to a certain extent, immaterial. I think the great difficulty in the Volunteers is that it is impossible to establish a system of company field training subjects on the same lines as in the Regular Forces. I think that drill is the main essential to begin with, and must be steady, and officers should not devote too much time to tactical subjects without giving enough time for drill.

Lieutenant-Colonel LUCAS: There is one point in the extremely able paper which Colonel Cave has been good enough to prepare which I do not think has been referred to. Colonel Cave has alluded in his paper chiefly to what I may call the higher strata of the training of Volunteer officers. But that is not everything. Unless they are properly grounded it is no good instructing them in the higher branches of the subject. There is one very weak point in London corps—I speak only from knowledge of them, I have very little knowledge of country corps—which I may be allowed perhaps to allude to, and for which possibly a remedy may be found, that is, the instruction of senior captains and field officers. In London it is almost impossible for officers of that rank—excluding commanding officers—to have any opportunity at all to drill their battalions. Owing to the exigencies of the Regulations, not more than a certain number of battalion drills are possible every year, and it is natural that Colonels should wish to learn their work themselves; they take command on those occasions, and consequently field officers and senior captains preparing to be field officers never get the chance of drilling a battalion. I think, with due respect, that some means should be found to obviate that difficulty. I hardly like to throw out a suggestion myself, because a suggestion ought to come from those above me, but it is very possible that by the payment of a small fee it might be managed, and I am quite sure the majority of field officers, instead of receiving a grant as Colonel Cave has suggested, would be very willing to pay for instruction in such a matter. Arrangements might be made on payment of such small fee with one of the battalions of the Guards to supply this deficiency. I throw out this suggestion for what it is worth, as I feel certain—and I think there are others in the room who will bear me out in this—that the senior officers, with the exception of the commanding officers, of the Volunteer Force in London at all events never have the chance of exercising their men at all, nor of commanding a battalion on parade. One officer, an ex-adjudant, has said it was the absolutely essential foundation of the whole matter, and if an officer is not properly grounded in drill, tactics, topography, and military law are no good at all.

Lieutenant-Colonel BALFOUR: Colonel Cave and I have often talked over this subject before, and I confess I came here expecting to find some very important suggestions for the improvement of the training of the officers. I am sorry to say I came expecting meat and found a stone, and a very gritty stone I think it is. We have all of us tried to eat that stone at different times of our lives, and have all gone through examinations one after the other from our boyhood, and now, as far as I can make out, this recommendation which is brought before us is "more examination still." I object to that. I ought to say first of all that I am in accordance with him in saying that there must be a foundation examination in tactics, that is to say, junior officers ought to be compelled not only to train the men, but to go through an elementary pass examination in tactics. But supposing an officer has done that, and he is worth anything at all, he does not stop at the text-book he has mastered, but goes on to read military history, he goes on to solve practical tactical problems, and he goes on to read books on higher tactics. Are you to make that man at a subsequent stage go through another examination? The thing seems to me to be childish; he has got beyond that stage altogether; he has got beyond the stage where examinations are important or necessary. And not only that, but tactics in itself are absolutely unfit for higher examination. What should I do supposing to-morrow I had to go in for an examination in tactics? What should I enquire? I should not read my text-books; I should find out what the particular fads of the examiner were. I should answer the questions, not according to the answers which in my opinion were right or wrong, but I should find out what Colonel this

or General that's particular views on outposts were, and should answer the questions according to his views. In other words, tactics, when you get to the higher branches, is in no sense an exact science, and it is absolutely impossible to conduct examinations in higher tactics with any approach to common sense at all. On that ground, besides others, I think very strongly that one pass examination in tactics is all we require to earn a grant, and I do not think it desirable or necessary that once a man has passed in tactics he should ever pass another examination in that subject at all. But I do not want my criticism to be purely destructive; and I believe there is a method by which the training of Volunteer officers in tactics can be carried out with ease, and, I hope, success, and that is the method which has been suggested to us by the late work of the Home District Tactical Society in the shape of outdoor exercises. The difficulty, I think, we all have to contend with is to train officers and men together. Let us take the case of outposts. Supposing you try to train officers and men in outposts for the first time, you waste your men's time, you teach them nothing; you keep them hanging about for hours and hours whilst the officers are being trained. But if you take the officers out, first of all showing them on the map what they have to do—that is the War Game part of the training—secondly, taking them on the ground as the Home District Tactical Society does, you have then taught your officers all the tactical part of the work. The next stage is the pure mechanism of telling-off the pickets, and so on. That could be done in a comparatively small space, independent of tactical instructions. The smaller the space the better, because the commanding officer has everybody under his eye. The last stage of all is what I hope we shall do to-morrow, *viz.*, combining the tactics and the mechanism. In other words, the suggestion I have to make is that the principles of the Home District Tactical Society's exercises should not be confined to big associations of that kind, but should be carried out in each battalion by the commanding officer or his adjutant, or both, in respect to the company officers. I believe by those means we shall not only succeed in interesting company officers in learning tactics, but we shall make them read their books, and we shall succeed in bringing them to a higher level of tactics than any number of examinations could possibly produce.

Lieutenant-Colonel SIMONDS: It is on one point only that I wish to address you, and it is with regard to the point which has been brought up by my commanding officer with regard to examinations *versus* practical training. Major Balfour has said a good deal of what I meant to say, that we are over-examined in the present state of English education, and we ought not to add examinations, and you can't expect men voluntarily to go in for examinations after they have once taken their degree, or passed the compulsory examinations necessary to start them in their career. It seems to me that the way in which we can really do something towards the practical training of Volunteer officers would be to increase the facilities with which they can see things done practically. For instance, I believe that at certain times of the year, all over England, companies of Regulars are knocked off duties, and are going through military training. If the officers of the Volunteers around them could be allowed at such times as they could come to look on, even if it be only in *muti*, to be there not as interlopers, but being allowed to see what is being done, it would be advantageous. If necessary attach them, and let them come in uniform. I think, to some extent, a great deal might be done in that way, and I know a great many men are of my turn of mind. If an examination or a book is proposed to me, I shy; but if I am asked to go to Aldershot or headquarters and see some work being done, it is a temptation to put aside almost every other duty. Some of us went to the manoeuvres in Berkshire last year, and I am very glad to have the opportunity of saying how much we were indebted to the commanding officers, in fact to all the officers of the Regular army there, who allowed us to ride through their ranks, and to go close up to them to hear what orders they were giving, and to really poke our noses into everything, although we were merely in civilian dress, and so enable us to get, to a certain extent, at the working of their minds, and see how they were disposing their men and carrying things out. It struck us all who were there at the time that if we could organize something to the same effect on a larger scale, if Volunteer officers could be at these manoeuvres in some recognised status, under some capable instructor, it would be very bene-

ficial. Our great difficulty was to get at the ideas beforehand, and we had to go and become a nuisance to some staff officer, by riding up to him and asking what they were going to do. If we had had a mess of Volunteer officers there under some instructor, and could have got hold of the ideas the night before, and could have worried them out, and then came and seen what the men did, and had our own little pow-wow, after the big pow-wow was over, I think we should have learnt more. As it was we learnt a good deal, but of course we were there as interlopers, and if a great crowd of us came there as interlopers, going about in the way we did among the regiments, I am afraid we should be a very great nuisance. It is a thing for our tactical societies, if the Home District Tactical Society could take that up, in communication with the authorities so as to get permission, I think we could learn a great deal. Another point as to practical training *versus* examinations, I know my commanding officer has passed a fortification examination, and I have not. I do not mean to say that I have not read about it, but I really think we should be in the same hole if we were given command of a battalion, and told to entrench ourselves. I do not believe that reading any amount of books will really tell you what you have to do under these circumstances, and it is a thing which it seems to me that passing examinations has no effect upon, but you must go and dig for yourselves. I think practical opportunities will draw officers, and examinations will only make us shy.

Major BUCHANAN-RIDDLE: As an adjutant of a Metropolitan corps I may be allowed to say a few words about tactical training and the training of Volunteer officers. I think if the officers and captains get so few opportunities in the ordinary way, they have very good opportunities of drilling a few men in their drill halls if their corps possess them. I find officers get extremely handy in working thus, say, two or three little companies, and can really pick up the whole of the drill, and not only that, but become excessively smart from having to do whatever pieces of drill are chosen for them in a very small space. They have to think quickly and act at once upon the instructions they receive. Secondly, I think there is a great deal to be done in and near London in the way of minor tactics. Last year my corps had a very good evening, I think in October, in Hyde Park. We were not troubled by spectators in any way, and we found there was no difficulty. We threw out a line of outposts from the road to the Serpentine, and practically taught both officers and men the drill. Again, we occasionally go out to Wimbledon; another time upon ground of which we know nothing, and find that farmers are most civil about letting us go over their land if the hay is cut. In the autumn they make no objection whatever as long as spectators are kept off, and the police can look after that very well. I find that the great difficulty with some officers is that they have not yet mastered the drill book. I do not think that it is the fault of their commanding officers or adjutants that they have not done so, but when they have been once through the school, they think sometimes that is all that is required of them.

Colonel BAYLIS: This is a subject in which I have always taken the deepest interest, and I am one of the oldest Volunteers—"The training of its officers." The difficulty is to get officers, and it is surprising that we get so many. When you look at the demands on their time and pocket and other disadvantages there are many attractions, but the greatest will be when the defence of our country is necessary in war, or immediate apprehension of it. That time has not yet come, fortunately. With regard to army examinations, in all professions there are, or ought to be, examinations as a test of efficiency; they are too often overdone, which leads to cramming, when the best memory wins. I heard Mr. Sidney Herbert, when Secretary of State for War, say in the House of Commons: "Mere bookworms we do not want in the army; you must combine with the book, practice." I derived great practical benefit at Dover, and afterwards at Aldershot, where I had the privilege of being attached to two line regiments. Having passed the school at Aldershot, I felt it an honour to have placed against my name in the Army List. The lecturer recognises the distinction, and wishes to extend it as with the Universities. It costs the country nothing.

Colonel TROTTER: I am afraid that if you increase the examinations that you will, in a great many corps, find it even more difficult to keep up the number of

your officers than you do at present. As an inspecting officer who has been found fault with, I should like to say that I think we must hold commanding officers responsible for the instruction of the junior officers, and if they are not found efficient, commanding officers must be asked to get rid of them. I am certain that not only the officers of the brigade to which I belong but every officer in the army would be only too glad to allow Volunteer officers to attend his company training and camp instruction if they would apply to do so, as it is the wish of all the Regular officers to assist the Volunteers as far as possible. With regard to the training of all ranks in the Volunteers, when a colonel of a Line battalion wishes to get his battalion really smart and efficient, he applies to have it sent to Aldershot, and as a brigadier of five years' standing I should like to impress on Volunteer officers the importance of trying to get to Aldershot to a brigade camp at least once in three years; I am sure they will learn there, by being associated with the Regulars, many details which would be of the greatest service to them. I am aware it has been stated that at Aldershot in August there have been in past years too many long field days and not enough definite instruction; I believe that is not to occur again. I am further of opinion that young officers can learn more of the duties required in outposts and elementary fortification by practical experience at Aldershot than they can by book study.

Colonel DU PLAT TAYLOR: I would wish to echo what Colonel Trotter has said as to Aldershot. I have taken my regiment into camp with Regulars in 24 consecutive years, and can testify to the useful training in tactics which is there afforded to Volunteer officers, and I sincerely hope that so long as I command a Volunteer regiment I may have the privilege of taking it into camp, and thus giving the officers practical acquaintance with tactics. With respect to Colonel Lucas's remarks, I fully recognise the difficulties which field officers of Volunteers—not being commanding officers—experience in qualifying themselves to drill a battalion, and I agree with two officers who subsequently spoke that such practice may be obtained with a skeleton battalion. It has always been my practice to hold skeleton drills—making it compulsory on officers and sergeants to attend. Every field officer and captain has opportunities of commanding at these drills, and they all thoroughly learn their work in battalion. I should like to see such drills made compulsory throughout the Volunteer Service. Whilst entirely agreeing in the lecturer's proposition to establish a tactical school at Aldershot, I cannot quite follow him as to the desirability of examinations in respect to those officers who have the opportunity of practically learning tactics. Much can be done in this direction near London and at the ordinary battalion drills—say at Wimbledon, Hampstead Heath, even in the parks—and the officers and sergeants having been thoroughly grounded in battalion drill, practising with skeleton battalions, all drills in the open should be devoted to extension movements and tactics.

The CHAIRMAN: I regret that my remarks must be brief, as I must shortly return to my duties at the War Office. I think this has been a most interesting discussion. We have had a very great divergence of opinion on most subjects, but on one question I am sure we all agree, and that is in our gratitude to Colonel Cave for his kindness in preparing his lecture and delivering it here this afternoon. There are a great many questions in this lecture which I am not able to discuss, because, although I may have strong ideas, yet being at present at the War Office, I might have to deal with these very questions when they come for decision. With regard to Colonel Cave's mention of the Regular officers being unfitted for service with the Volunteers, I agree with him to a certain extent. For the last two years I have done my best to try and obtain the services of Regular officers retiring from the army for the Volunteers, and I agree with Colonel Cave that the Regular officer is not, as a rule, a success in the lower ranks; he finds the discipline is different, and the system of command is also so much changed, and it is difficult for an officer who leaves the Regular Service to adapt himself to service in a Volunteer regiment in the subaltern ranks. But as regards officers who retire from the army and who return to their own county and accept the position of major of Volunteers, and eventually succeed to the command, there are many cases in which that has been a great success. But in the lower ranks I think Colonel Cave is quite right, and that it is difficult for officers to adapt

themselves to the position. There is one proposition of Colonel Cave's which, I think, would be acceptable to the financial authorities, because it effects the saving of 280*l.* I think I could propose that with great success. But I should be very sorry to see any diminution in the grant, and I think it is very unwise to be continually altering our regulations, taking 10*s.* off a subaltern and putting it on to a captain, &c. We have a difficulty in getting captains, but we have greater difficulty in getting subalterns, and I should be very sorry to see subalterns fined 10*s.* Colonel Simonds spoke of the advantages of Volunteer officers attending military drill. This is not a question for the War Office at all, that would only, perhaps, make a greater difficulty, but I feel sure if Volunteer officers would take a little trouble themselves and would apply at the time of the regimental training to the general officers commanding the district, through their commanding officers, to allow them to attend, I think there would be little difficulty. I was waiting for a long time to hear what I consider to be the solution of the whole question, and it was not till Colonel Balfour spoke that we came to the "commanding officer." My idea is that the commanding officer is the only man through whom you can really arrange the proper training of his officers. You may make any sort of regulations; we may fine you or reward you, but it is through the good feeling of the officers, the energy of the subalterns and captains, assisted and promoted by the commanding officer and the senior officers of the battalion, that a good result can be obtained. That, gentlemen, is the only way in which, eventually, you will get your Volunteer officers properly trained to a proper and a high standard. In many parts of the country there are organizations, and there is one I attended this year, which, I think, really should be a model for every institution in other parts of the country. I refer to the Open-Air Tactical Association, which met at Arundel. I have seen a certain amount of training, because for 10 years I was engaged in taking men from the Egyptian soil and trying to turn them into soldiers, and instructing the officers. Of course our difficulty with the language when we first commenced to reorganize the Egyptian Army was at first very great, and the best way by which we could educate the Egyptian officer in tactical exercises, in the pickets and the outpost duty required in the field, was to take them to the spot and communicate to them first our views and leave them to work them out. This is exactly what I saw at Arundel, and there is nothing that has impressed me more, and I am sure that if these exercises could only be carried out in other parts of the country it would prove a most excellent tactical education. There was a large increase in attendance this year, and I sincerely hope there will be a larger next. What has always struck me is, that when one gets to these higher tactical institutions one always meets the same men—Major Balfour and Colonel Alt, Colonel Bird, Colonel Cave, and others, and what we want is, that among these highly educated officers we should get new blood. That, I hope, is only a question of time. These exercises are so very well organized and so well managed that I trust that other organizations in various parts of the country will be formed, and I am sure that we shall find that the open air exercises, assisted and promoted by the commanding officers, will be one of the great factors in improving the training of the officers. I thank you again, Colonel Cave, for your kindness in giving us this lecture, and I am sure we are very grateful to you for it.

Colonel CAVE (in reply) : The principal object of my paper was to initiate a discussion upon this subject, and I am very glad to say that we have had a very good discussion. I may generally sum up, I think, without alluding to individual speeches. Many insist on the fact that drill is of the first importance. Of course drill is of the first importance, and I thought I had sufficiently stated in my paper that I did not for a moment wish any substitution of tactical or other studies for drill. But as I think we all realize we often can go to a War Game when we cannot get the men to drill. If you can get men to drill or to go into the field for practical exercises by all means and under every circumstance do it, and do not read a book or stay indoors. But there are times when we cannot get men to do that, and when we may usefully employ ourselves in other ways. The other class of criticisms, if I may so call them, referred to examinations. Now I am no more in love with examinations than anybody else, but the only light in which I regard examinations is as something to induce men to take up a subject and then become interested in

it. If you can make him interested in it without his going in for an examination I do not care twopence about the examination, but there is just the fact that you must have something definite to put before him, and these examinations and the possibility of earning a small grant for his corps furnishes an inducement to study. I must allude to one thing stated by my friend Colonel Balfour which struck me as extremely peculiar. Although he objected to examinations, he absolutely goes farther a great deal than I do, and he wishes to have the examination in tactics compulsory for everybody. Colonel Trotter made one observation which I should like to allude to. He said that commanding officers should do everything. Of course commanding officers should do everything, and as a commanding officer I wrote this paper, hoping to make my own officers and others learn more of their military duty than they do at present. My idea is that something might be done to help the commanding officers. But Colonel Trotter said that if we find a man is not up to the mark we are to adopt that system, which we all know, of getting rid of him. I should like to ask him what that system is, for I do not know of it. But even if we can get rid of them so easily there is another and a more difficult thing still, namely, how are we to get efficient officers in their places?

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Friday, May 4, 1894.

LORD BRASSEY, K.C.B., in the Chair.

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#### NATIONAL METHODS OF OBTAINING A SUPPLY OF SEAMEN.

By W. C. CRUTCHLEY, Lieut. R.N.R.

Lord BRASSEY: It is quite unnecessary to make a speech in introducing our lecturer to this audience. Lieutenant Crutchley, of the Royal Naval Reserve, has appeared here more than once, and every contribution that he has made to our transactions has had a recognised and very great value. The subject which he brings before us to-day is one of the highest importance, and I am sure you will find in the course of the paper that much information will be presented to you, and many important suggestions will be offered.

I HAVE been asked by the Council of this Institution to contribute a paper on this subject, and shall endeavour to do the best I can with it, presuming that the reason I was selected for this honour was that it was considered that any effective method of dealing with our naval requirements, so far as men are concerned, to replace wastage in war-time, must, in both its inception and maintenance, largely depend upon our mercantile marine. It is needless to say that my acquaintance with that body has been both of long standing and of great intimacy.

It will be necessary for me to mention that, when in the course of my remarks I speak of the Royal Navy, I do so because the supply of seamen, from the aspect we are now looking at it, is not so much to supply the wants of the merchant service as the Imperial forces. I have not sufficient knowledge of the Royal Navy to speak for it; what I may perhaps claim is to be able to express an opinion as to the qualification of men who, after being called out a short time, would make competent members of a crew for a modern battle-ship or cruiser. They might not be, and doubtless would not be, the trained and perfect fighting men we are accustomed to in the navy, and neither would they be the best men that could be picked for the higher numbers of a turret or barbette gun; but I conclude men wanted under stress of war pressure would suffice if they were trained to arms and capable of working modern B.L. and Q.F. guns. There is no doubt whatever that the better plan of all would be to so enlarge the regular force, that no outside assistance should be necessary. There is but one objection to this, and that is expense; to double our existing naval force of men would be an expensive undertaking; and I scarcely think that less would satisfy our wants if we are to be on the safe side in future warfare.

That at the present time we are short of men will, I think, be accepted without any argument. If I said we were short of officers, too, I don't think I should be far wrong; but that is not the point to-day.

In the report of the Royal Commission, presided over by the late Sir G. Tryon, on the Royal Naval Reserves, there is the following passage:—

“It appears that every great European nation is devoting much attention and money to the organization and equipment of their sea forces.”

We are immeasurably the greatest of all naval Powers, and probably for that reason we take so little trouble to set our house in order; in fact, it may be said that, compared with some other nations, we do comparatively little to maintain our fighting strength of men at sea. Our naval strength, inclusive of reserves, may, in round numbers, be put at 100,000 men, and beyond that we have an entirely untrained merchant service to fall back upon. It would not be prudent to expect to account for every man, or the *full* numerical strength of the Reserve.

It would also appear that a deduction of 10 per cent. must be made from the total strength of any naval force for wastage by sickness and other causes, irrespective of casualties in action. This being so, our naval strength at the present will suffice to man our vessels built and building, leaving little or no surplus to fill vacancies as they occur.

As, therefore, the sole recruiting ground for the navy must be the merchant service, it may be asked whether all has been done that can be practically done to render it an efficient one—for there is no getting round the fact that, beyond the 100,000 regular seamen, marines, and reserves, we have at present to rely upon a haphazard selection of absolutely untrained men who, for all practical purposes, do not know one end of a gun from the other. There is, however, the other side of the case to be stated, which may be briefly done, and that is that, if wanted, Jack would have to go, even as he did in the days of the press-gang and bounties. Bounties in war-time are expensive matters, as the Americans discovered last; and, as our annual expenditure for 23,500 officers and reserve men is only 172,000*l.*, it is difficult to see where a more economic scheme can be found than in a large extension of this force. Although I mention officers here, it is because I find figures and cost in totals only; this paper is meant to deal solely with men.

Before going into any further details as to our own forces, it may perhaps be as well to glance at Continental nations and the various systems pursued by them for the maintenance of their seamen. It is an extremely difficult matter to make any comparison between them and ourselves, for whereas we pay in money for the men to do our fighting, there, they being less wealthy, pay in kind: in other words, they all have to do it—as their turn comes; and compulsory service provides an outlet from a difficulty which, even with ourselves, is an ever-increasing one. I have no doubt that many officers here present will

hold that there is a great deal to be said for the Continental system, and that a leaven of discipline amongst our own masses would do no harm. The Germans, as a nation, owe much of their success to the discipline and good habits learned in their service; and I cannot resist the idea that sound discipline, once inculcated, can do no harm, even to a peaceful citizen, and in all probability exercises an influence for their good throughout life. I do know that our reserve men are the better for even the little training they get. The Americans and ourselves are the only two first class Powers that trust to voluntary enlistment for their military and naval forces.

Let us, for instance, take Germany—not by any means a first class naval Power, but with an ambition that, in the course of time, and if persisted in, will go far to constitute it one. There every consideration is solely for efficiency, at all costs. Every man and boy in the mercantile or marine service is liable to service in the Imperial navy from the age of 17 to 45. At the age of 20 every seafaring man must be enrolled in either the active or reserved forces of the army or navy.<sup>1</sup>

If not in active service he is enrolled in the Naval Reserves, and serves there for 12 years. At the end of 12 years, the men who have completed all their training pass into the Seewehr second class, others who have had partial training only into the Seewehr first class.

The former have many privileges not granted to the latter. After five years' service in the Seewehr first class, the men pass into the second, where they remain until they are 39 years of age, when they are transferred to the Landsturm second class, the last called upon in war.

In time of war no man either enters or leaves the Seewehr second class.

A man who volunteers for service in the navy may at the end of one year's service be examined if he pleases, to test his fitness to hold a commission.

About 5,000 men annually pass through the various branches of the German navy, therefore the trained naval force available at short notice is comparatively large and efficient, the actual number of men serving in the German Mercantile Marine is about 40,000; but it must be remembered that many, indeed, large numbers, serve in British and other merchant vessels.

With France also the entire male seafaring population is enrolled in the *Inscription Maritime*.

This includes all fishermen and boatmen on the coast and rivers to the head of tidal waters, as well as every man in the mercantile marine.

The enrolment takes place at the age of 18 years, subject to certain conditions; from that time until the age of 50 years the man is at all times liable to be called out for active service in the navy.

The number of men enrolled in the *Inscription Maritime* is about

<sup>1</sup> Active naval strength is 14,440 officers and men.

170,000 men, and from them about 2,400 are annually drafted into the navy for a period of seven years' service, of which two years *may* be spent on special leave in the Reserve.

At the expiration of his seven years' service the *inscrit* passes for four years into the active Naval Reserve, where he is liable to a call at any moment, unless he undertakes to employ himself in coast fishing or coasting vessels only, in which case he will not be summoned, except in grave emergencies. After this he passes to the 2nd class Reserve.

I find a certain difficulty in getting exact figures, but it may, perhaps, be safely said that, with a navy employing 40,000 men annually, there is an effective reserve force of 100,000 men.

In calling out the Reserves care is taken to exempt as far as possible pilots, masters, married men with families, and A.B.'s who have signed engagements for long voyages. It is probable that this class reduces the effective strength to the figures mentioned.

Only two-thirds of the annual number of men taken into the navy is from the inscription, the remaining one-third is from the military conscription, which means that about 3,600 men are annually passed through the navy into the shore Reserve or the merchant service.

All these men have certain privileges guaranteed to them. They alone have the right to follow the sea as a calling in French vessels, or engage in fishing for a livelihood; they are exempt from all other public service, and have certain free educational advantages, are exempt from certain taxes, and may travel by public conveyance at reduced rates.

As soon as a man is enrolled in the *Inscription*, a small portion of his earnings is impounded by the Government for the maintenance of a pension fund. This has now been instituted for 200 years, and is an undoubted boon to the seafaring class as a whole. If at any time injured or disabled, they are entitled to a pension, and are not liable to service in the navy after 50 years of age, but until then they are at all times liable to active service when called upon.

It is urged against the *Inscription* by a competent French authority that the most effective seamen of the present day are, as often as not, obtained from the conscription, and that, therefore, it is unfair to give the seafaring class the privileges and care for their welfare which is displayed by the Government.

It is argued that the demand for the seaman, or the man accustomed to go aloft and handle spars or canvas, no longer exists, and that the *Inscription*, to be really effective, should also include all those artisans that form part of the necessary complement of every modern warship, and there is also a tendency to assert that, once free from sea sickness, a landsman is as good as a seaman to work a gun.

It is, of course, easy to see that the abolition of sail power has rendered a call on men fit to go aloft of less value than it formerly was; but it is doubtful whether any amount of argument will ever do away with the value of men habituated to salt water for naval warfare. Actions are not always to be fought in fine weather, and the

seaman's instinct is and will always remain an important factor as long as craft of any sort go to sea.

A more serious argument is that, owing to the great falling off in French merchant shipping, the men passed through the navy become in a few years of doubtful value. Protection to an excess as shown by France appears to be of doubtful value. It is all very well to have a splendid reserve of seamen, but when a shipmaster may not discharge his crew abroad, and is compelled to employ all Frenchmen, with the exception of, I think, 4 per cent. of foreign element, it hampers trade to a serious extent; of course, French ships are subsidised very heavily, but even with every advantage they do not appear to be a very profitable investment.

There is one other very great divergence between the French system and our own, and that is that the French Navy appears to supply a large number of both officers and engineers for the merchant service. Not, perhaps, now to as great an extent as some years ago.

Italy possesses a most complete system for manning her navy, based upon an Inscription similar to France, but with a wider application; in fact, it does what the Frenchmen say they dare not even propose.

It includes, in addition to all seamen, fishermen, and boatmen, all persons whose occupations are in any way connected with the sea, or ships (here perhaps is where the line is drawn), such as shipwrights, carpenters, caulkers, machinists, firemen, and similar people; in 1887 the men on this list numbered 210,267; these are all subject to call at any time, and must serve in fleets or dockyards as required.

The men needed for service in the fleet are annually drafted from the Inscription for three years' active service and five years in the Reserve organized for service afloat.

In addition, from the Inscription are organized Reserves to furnish complementary forces to the regular navy and auxiliary forces for local services and coast defence garrisons. They are called out for short terms of drill in times of peace.

The number of men annually employed in the Italian Navy is about 20,000. I have no means of ascertaining how many are yearly passed out.

With Russia, the Navy proper, the Naval Reserve, and the coast defences are all so intimately connected with one another that it is impossible to establish the line which separates their functions one from the other.<sup>1</sup> The Reserve of men is practically unlimited, as drafts can be made at any time from the land levies to supplement the force afloat, and the impression appears to be that seamen are made as required without much trouble, as long as the man is drilled or trained. Their Volunteer fleet is a curious organization, and worthy of attention; it consists of ships owned by shareholders, but ostensibly managed by the Russian Admiralty authorities.

In Austria-Hungary service is compulsory on the maritime population; 1,800 men are enrolled annually in the navy, who pass four

<sup>1</sup> Active yearly strength of the Russian navy is 30,000 officers and men.

years in active service and five years in the Reserve. A very close supervision is maintained as to the whereabouts of the men until finally discharged.

The average force of trained men available is 12,000 yearly.

Spain, Sweden and Norway, Greece, and Turkey all appear to have fair Reserves on paper, the first and last showing about 50,000 each.

To summarize the Continental nations, it would appear that their navies are the *principal* training schools for their seamen. Where a mercantile marine of any strength does exist, we find it subsidised by Government to a large extent, as in France and Germany, and the vessels appear to be officered in most or many instances by officers from the navies of their respective countries.

There does not appear to be any attempt (except in a very small way by France, what may be termed an experiment) to train either officers or men for the mercantile marine. Sole reliance is placed on compulsory service and the country's navy as the one grand school for all seafaring men; in fact, in comparison with our own want of system, we are as opposite as the poles, but it somehow gives us the impression that we have not altogether mismanaged affairs. Seeing that our merchant vessels get little or no protection, that mail subsidies are yearly decreasing, and that the struggle for life is becoming daily keener, the contrast cannot be an altogether unfavourable one for us, and goes far to silence those who are in favour of legislative enactment to protect our merchant shipping.

The only country that can in any way be compared to ourselves in this matter is the United States of America. State service with them, as with us, is voluntary, and by common consent it is agreed that the men who undertake to fight when required for the benefit of their country shall be paid by those who prefer a more peaceful existence. This, however, is not quite so with us, for naval and military officers have to pay their proportionate share for the defence of the country, as well as serving also.

In 1888 the total number of seamen employed in America was 52,520; this included foreign and coasting trade; the number of Americans or naturalized Americans was 25,384, so that more than half of the complements of their vessels were made up by foreigners. Considering the vast flow of emigration there is to the United States, it does not appear as though this possesses the same significance as it would do to ourselves. Their population is constantly augmented from all countries, and these various nationalities, after a very short time, all become merged in the great American nation. Considering, also, the immense numbers of aliens who fought and died in the American Civil War, there is, perhaps, a certain fitness in placing the rights of citizenship within easy reach of all comers, so far as the seafaring population goes. Many foreigners sail in British vessels until they have acquired our language, when they transfer themselves and their services to America.

About the same time, according to a Parliamentary Return, the number of officers and men sailing in British vessels was 204,470, of which number 41,856 were foreigners. This does not appear to be a

very large proportion until it is remembered that these men are mostly employed in the foreign-going ships, by which the percentage of foreigners in that class of vessel is brought up very considerably. It is commonly said and believed that Scandinavian and Continental seamen generally are steadier and more amenable to discipline than our own; this is, at the best, a doubtful statement; there is a great deal of evidence to show that these men are fairly quiet and obedient until they have mastered our language, when they become quite as troublesome or worse than our own men.

The United States of America have apparently any amount of money to spend upon an idea, when they take one thoroughly into their heads, and of late years one of their most cherished wishes has been to again become a naval Power. Their efforts in this direction are especially interesting to us, not only as showing the lengths to which they will go, but also as to the expense they are willing and anxious to incur for the furtherance of their wishes.

With the example of protection set them by France and Germany, and the comparatively poor results attained by it, they have embarked on the same course with a light heart, and the result of the experiment will be awaited with interest by us; certainly if iron shipbuilding can once be made to flourish in America we shall have a most formidable rival in trade, but it is very doubtful whether Americans as a nation will ever take seriously to the sea as a calling or profession.

It has been found necessary by them to encourage, if possible, a seafaring population; this, of course, is the natural outcome of a shipbuilding programme. The means adopted are good, but they would be subject to criticism on this side of the water, where conditions are different, by which is meant that officers as well as men are trained at the public expense for their mercantile marine.

We ourselves have, at various places round the coast, 18 stationary training ships for boys, with a total annual complement of about 4,500 on their books; 14 of these ships appear to be for the reformation of indifferent characters, and waifs and strays generally, and of the boys educated in them a large number never go to sea at all. It is doubtful whether the class of boy brought up in them is generally what is wanted at sea, but the great trouble experienced in placing boys at sea anywhere prevents their entering the merchant service in any great number, they are merely mentioned because they are so-called training ships, but in reality are floating schools for the education of poor boys.

It is needless to say that the "Worcester" and "Conway" are not included in this category, they being solely for the training of officers and self-supporting.

It is, at best, doubtful whether, for our mercantile marine, officers should be trained at public expense; there is a strong feeling in favour of a such a course in certain quarters, but the objections are twofold, it would eventually put a stop to young men of good family and education adopting the sea as a profession, and it would not raise the general status of the merchant service; the tendency would be to make masters and mates of men who would be good boatswains and quarter-

masters spoiled ; if more highly educated men are wanted for our merchant service, lots of people know how to get them without any trouble.

However this may be, the question of how to encourage a seafaring population as understood by the Americans has led to the adoption of the following system by them :—

Upon written application being made by the Governor of a State, the Secretary of the United States Navy has power under an Act of Congress to lend a suitable naval vessel, with all her equipment complete, to be used for training American youths for the merchant service, at each or any of the ports of New York, Boston, Philadelphia, Baltimore, and San Francisco, and to detail naval officers as superintendents and instructors thereof, provided that the ship be returned when no longer required, and that the ship is not used for reformatory purposes.

In this latter stipulation is a safeguard surely made by a seaman of experience against the common impression that any street arab is good enough to send to sea ; to that idea may be traced all sorts of evils ; it is needless to say here what the sea is as a calling, we all know that it can be made what people please, and certainly is a vast improvement upon what it has been in years past.

These American training ships are officered and commanded by specially chosen officers, and their primary object is to turn out thoroughly qualified seamen and navigators. In the matter of routine and general conduct, naval discipline is adhered to as consistently as their work will admit of, and the general results obtained from these ships appear to be entirely satisfactory.

The conditions of entry are as follows :—Boys over 15 are received with the written consent of their parents or guardians, they must pass a rigid medical examination, be fairly well educated, and have sufficient clothing for their requirements, all other necessaries are provided for them.

The cost of maintenance of the ship is borne by both the State and city applying for it. As an instance of the sort of extent to which this system is carried, New York, Boston, and Philadelphia have each a ship and San Francisco is getting one ; from 100 to 200 boys are carried in each vessel, and in one of them, I am not sure which, the boys are trained specially as officers, in the others they appear to educate the boys well and leave their future destinies in their own hands. As they are the sons of all classes of people, it is reasonable to suppose this arranges itself.

This is a good beginning, though but a small one, say 3 to 4 per cent. on the American sea-going population, but when once the principle was laid down that it was necessary to train boys and so to establish the nucleus for the formation of an almost lapsed calling, it is scarcely probable that any difficulty would afterwards be placed in the way of their after employment, and herein is a very great difference from the common practice which obtains with us.

The United States naval force is 9,000 officers and men. They appear to be taking efficient measures to increase their Reserves in proportion to their Regular force.

It will scarcely be believed that there is the very greatest difficulty in getting boys to sea either as apprentices or before the mast.<sup>1</sup> If I wished to send a boy to sea to-morrow before the mast in a sailing ship, I should not know how to set about the undertaking unless I was prepared to pay for him. That boys do go to sea is certain, how they manage it is rather a mystery. In some steamers, boys are taken from ships like the "Shaftesbury," but as a rule they are of very poor physique, although fairly good boys, but if I say that these youngsters are mostly taken as a favour, I shall not be far wrong. The demand at sea now is for one of two things, either apprentices who will pay a premium to go to sea, or else the so-called able seaman.

There has been a deal of talk lately about the return to the apprenticeship system, in fact the Royal Commission, of which the late Sir G. Tryon was president, expressed an opinion in favour of it. We know that large sailing ships do carry a fair number of apprentices, say six to a two thousand tonner, and I dare say that they would take more if they could get them on the same terms. Say these boys pay a premium of 30 to 40 guineas each for a four years' apprenticeship, are the profits of large sailing ships cut so finely that this premium spread over a period of four years means loss if not received? It scarcely seems probable. The reason must be looked for elsewhere, and the inference can only be that it is the trouble of looking after the boys in a home port.

There are one or two other matters that it may not be out of place to mention here. One is that, except in the case of passenger vessels, there is no rule laid down as to what is the proper complement of hands for a merchant vessel to carry, the other is that there is nothing to prevent a British vessel being both officered and manned by foreigners.

There has been some outcry as to the deterioration of British seamen of late years, and it matters little with whom the cry originated, but there never was a time when British sailing vessels went to sea with as few hands as they now do. Of course, labour-saving appliances have increased enormously, and as each new contrivance is put in a ship, the next thing heard is, that fewer hands are to be taken to compensate for this. Many other causes have also operated to produce the same effect; in years past the cargoes of vessels in foreign ports were almost invariably discharged and loaded by the vessels' own crews; now all this has passed into the hands of shoremen, or nearly all; and, consequently, with a long stay in port, the shipowner has to support his crew while they are simply doing the ordinary work of the vessel, which in many cases is not enough to properly employ them for a lengthened stay on shore. All that can be said is that if the British seaman has deteriorated, he must have been a wonderful fellow in times past. When an enormous four-masted sailing ship goes to sea, say of from 1,500 to 2,000 tons, with a crew of under thirty all told, it is useless to contend that the men of to-day are not good seamen. I have met scores and hundreds of

<sup>1</sup> In British vessels.

these vessels at sea, and I must say never without a feeling of admiration for the men who get them about with as few accidents as happen. It may be admitted that seamanship as understood in the days of wooden ships and rope rigging has died out; but it has gone because iron spars and wire rigging require to be handled in the place of them. The niceties, so called, of the art, have gone, but they have gone only because they had ceased to have any practical value. But no matter how good a seaman may be, and no matter how many labour-saving appliances may be adopted, there has yet to be discovered one which shall endow the seamen with the special attribute of Sir Boyle Roche's bird, that is of being in two places at once. This question of manning is one that is gradually coming to the front and claiming attention.

With regard to the question of British vessels being manned by foreigners: in 1888 the total number of men and officers employed in British vessels was 204,470, of which number 41,856 were foreigners. In 1892, the total number of officers and men was 241,735, of whom 30,899 were foreigners and 25,399 Lascars. In the former Return Lascars were classed as foreigners, so that we have a total of 56,298 seamen other than British; an increase of 14,000 in five years. In 1887, British tonnage was 7,144,097 tons; in 1891, 8,279,297 tons.

Upon the face of these figures it does not appear as though our seafaring population had increased in proportion to our tonnage, and it is also evident that there has been a greater increase of the foreign element.

The more serious part of this is that there is a very great increase in the number of other than British masters and mates; this may not appeal to all people alike, but it is not a pleasant thing to see the British flag in charge of a foreigner. It might be the cause of all sorts of complications in war-time; for in all probability a man would favour his own country in preference to the one of his adoption, and irrespective of that, an alien master will naturally favour his countrymen in the choice of a crew, to the exclusion of our own countrymen. If we were not dependent as we are upon our maritime strength, we might afford to look with equanimity upon men sailing our vessels for low wages with their own countrymen, but when we have to fight for our existence at sea it will take a great amount of trouble to undo such mischief. The transfer even of any vessel of ours during war to a foreign flag is in each case a misfortune, although it is so glibly spoken of as likely to happen. It was mentioned in the House a month or so ago, but in reality it would pay us far better to lay up or even sink our sailing ships and slow steamers than sell them. If captured, of course, it cannot be helped, and we ought to be able to guard against that, but as no one else has the ships in existence to do the carrying trade of the world, it would be suicidal on our part to give them the means of doing so; if the ships were burned or destroyed, as they doubtless would be after capture, what other nation has our facilities for quickly rebuilding and so retaining the trade we have acquired by so much industry and

trouble? At present the work *cannot* be done without us, and we must, capture or no capture, carry on our trade.

It is not contended that the proportion of aliens or foreigners has yet reached that point where active interference is necessary, but it is a steadily growing evil, and one of rapid growth also. Technically, the State has still a right to the services of all its seafaring population in war-time, the claim upon men other than our own countrymen would be but of little value. It is scarcely necessary to say more on this head—it is so self-evident.

It has been the fashion of late years in order to arrive at an estimate for the necessary strength of our fleet to contrast it with the combined fleets of France and Russia; it may, perhaps, be as well to compare our strength in men in the same manner. There we have France 40,000 men on active service, 100,000 in reserve at a very moderate estimate.

Russia 30,000 men in active service, with a practically unlimited Reserve of however a doubtful or unknown quality, but not to be disregarded if one may reason by inference.

We have a total force of 85,000 officers, seamen, and marines, including boys and some Reserves, with a Naval Reserve of 24,000 men only, of which number 10,800 only are in the first class.

We see Italy also with an active force of 20,000 men, and practically unlimited Reserves, and if it were said that Germany had more trained seamen to fall back upon than ourselves, the case would not be very much overstated. By this is meant, men showing in the country's books as liable to service and trained up to date.

If it were merely a question of raising men to go to sea, we might content ourselves and be at rest on the matter; but on all sides one hears from the most competent authorities that it is necessary to have *trained* men, and it is equally certain that we have not got them. The comparison of our naval forces with those of other nations speaks for itself. Even America has five seagoing training ships to establish a Reserve for a present force of 9,000 men.

It is, perhaps, accepted now as a fact better than it was a dozen years ago that the Royal Navy and the merchant service must both stand or fall together: my reason for saying this is that I have been re-reading recently a paper read in this theatre a dozen years ago by Sir N. Barnaby, who, in concluding his remarks, made use of the following words: "You are certainly of opinion that at present, whatever it may be our duty to do with regard to the merchant shipping of England, we cannot regard it as a very great power for ourselves. My question has been, ought we not to try to make it so?" It appears to me, from my view of the situation, that that paper was rather before its time and yet badly wanted.

The opinion of the Secretary of the United States Navy is there quoted also, who says: "As the merchant marine is dependent at critical periods upon the navy, so, on the other hand, the navy, no matter how strong it may be, must in emergencies avail itself of the resources of the merchant marine."

At the time that paper was read, however, there were not many

people who gave very much consideration to any question of manning the navy save in the regular service fashion. The growth of nearly all navies has taken place since that time, and improvements in ships and weapons have brought us face to face with a problem which it has never before been necessary to solve, and that is "without unduly increasing the standing force to provide a large Reserve of men fairly instructed in the use of modern weapons."

*In this modern want the accomplishments of the seaman, such as handling sails and such like work, may be placed in value as nil. A steamboat man, who is also a fair boatman, will meet all requirements. I think we shall all agree that every man who goes to sea in any capacity is always the better for a thorough seaman's training: it gives him what may be termed the seaman's instinct, and that is a gift only to be obtained by familiarity with masts and spars, but in the future this will be a luxury possessed by few and quite unappreciated by the many.*

*My duties have never taken me into contact with any save the 1st class Reserve men, and consequently I am unable to say much about the 2nd and 3rd classes. There is only one fault that I know of to be seriously considered with reference to the 1st class men, and that is that there are not nearly enough of them; if, as is being done now, they have a chance given them to put time in, in the navy, they will do it. A very great majority of the men like the Service and the occasional change, but as pay in the navy is less than it is in the merchant service, the men cannot afford to lose money, and must have it made up to them either now or in a pension being granted at an earlier age than is done at present.*

As was mentioned before, we have in the mercantile service of the United Kingdom British subjects to the number of 185,000 men, of whom we have 23,000 wholly or partially trained. Does this proportion seem sufficient to meet our possible wants? If not, what are we prepared to pay for more, and how obtain them?

It has been said that we have 40,000 more men available for the 1st class Reserve, but, doubtless, some rules and regulations would have to be stretched to get them, and then the remedy would be but a temporary one.

What has been pointed out in connection with our mercantile marine is this, that we have no system of training worth speaking about; that it is recruited in an absolutely haphazard fashion, and that, compared with Continental nations, we do not make the most of our resources. I know well that one must not touch on protection or interference with shipping, but a great deal can be done without interference with either one or the other. And in any scheme of training men in which both the Royal Navy and merchant service are interested, it would never work if young men were too long or too closely identified with the Royal Navy, too long a connection with that Service would give, or tend to give, them a distaste for handling cargo or the ordinary work of a merchant seaman.

For instance, boys of good physique being educated in Board schools might be brought up in a special class with a view to their

going to sea. There is no reason why the son of any respectable artizan should not be content to look forward to becoming quarter-master or boatswain of a merchant vessel as a means of living. This might be in connection with *training ships*, to which they would be drafted, and which there is no reason to suggest should not be in a large measure self-supporting. It is rather difficult to see why money should be spent on one sort of technical education and not on another. Again, on the other hand, if any attempt were made to rear lads for a seafaring life there is always enough work to be done for Government to support several of these vessels. The boys might be apprenticed for four years, and, after that, to serve two years in the Navy, when they would be discharged into the 1st class Reserve, and pursue the ordinary course as now adopted.

This training might be carried out in barque-rigged steamers; I do not mean auxiliary vessels, but good steamers of large carrying capacity, and capable of steaming, say, 10 or 11 knots.

This is a mere suggestion. I think myself that with such training the men when discharged into the Reserve would be sought for by steamboat officers wanting crews.

It would also encourage a return to the old apprenticeship system, which was not a costly one, but has failed hitherto for want of organization.

And probably the best course of any which could be adopted with a view of giving coherence for Imperial purposes to the mercantile marine would be the establishment of a compulsory pension fund. Even supposing that foreign seamen did have to contribute to it, they receive advantages whilst serving with us which would quite compensate them. This sounds like protection, but is in reality but a very mild form of it. I believe that the simple formation of such a fund would do more to encourage our own countrymen to man our vessels entirely than any other course which could possibly be adopted. There is no doubt but that the knowledge that a provision is made for old age or accident is one of the greatest inducements to men or boys to adopt any calling. The machinery is in existence which could collect and administer such a fund, and Government sanction is all that is needed. Of course it would receive lots of opposition from the leaders of unionism, but they, I think, would alone constitute the opposition to it.

Our merchant service, as we all know, is a very fine one, but we neglect it, and do not make as much as we might of the advantages it offers us. Life at sea in a modern well-found steamer is not by any means a bad calling for a man who prefers a life in the open with now and then a little variety. I think that the calling of a seaman has improved vastly of late years, and if we can increase our sea population by another 50,000 men the country will reap the advantage both in money and the means of defence when required. The question raised by this paper is—Is it worth while or necessary to increase our facilities for recruiting the Navy?

Admiral Sir George ELLIOTT, K.C.B. : My Lord, ladies, and gentlemen, I desire, in the first place, to express the satisfaction I feel, which I am sure is felt by all present, and will be felt by the Service at large, at the fact of your Lordship taking the Chair on this occasion, for there is no one more capable of forming a correct judgment of the merits of the paper which is the subject for discussion, and of giving weight to that judgment in the councils of the nation. The time allowed to each individual for commenting on lectures delivered at this Institution is necessarily so far limited that it is not possible to do more than to select a few points on which to offer any remarks. I am, however, greatly relieved on this occasion of any difficulty in respect of making that selection, as I find myself so generally in agreement with the lecturer in all that he has laid before us relating to the wasted resources of the mercantile marine for war purposes under existing regulations, and also as to the reforms by which he indicates that this waste can be converted into a great gain and a prominent feature of Imperial defence. I desire to preface the one single point to which I will call attention by expressing the high sense I entertain of the great merit of the paper which has just been read by Lieutenant Crutchley, which, taken from the point of view alone of that great national institution the mercantile marine, and as an exposure of its faults and a testimony to its capabilities, is a display of the highest professional knowledge of the subject referred to, enhanced by a spirit of true patriotism, which must recall to reflective minds the reckless abandonment of those navigation laws which preserved to us in former days a most valuable naval reserve for the service of this country. Lieutenant Crutchley points out by what means this source from which a reserve can be obtained may be restored to its traditional state of efficiency, and on that point I for one can find no room for criticism. But his reforms, although urgently needed, must be a work of time, and as Nemesis stands at our door, common prudence demands that we should look to more rapid means whereby to maintain our naval supremacy, and that is the one point to which I desire to call your attention. I notice that Lieutenant Crutchley says that his duties have never taken him into contact with any but 1st class Reserve men, and that, consequently, he is unable to say much about the other classes, and I wish to supply that omission: and I speak from experience when I say that whilst detracting nothing from the importance of fostering the mercantile marine as a reserve in the manner proposed by the lecturer, I look to the class of men from which our 2nd and 3rd classes are obtained as that which offers the readiest, most rapid, and effective means whereby adequately to increase the reserve of trained men for the Royal Navy. I raised 300 of that class of men to man the "James Watt" at the commencement of the last Russian War from the coast of Scotland. They were found so superior in physique to what the Admiralty were getting into their net, that they stole one half of them from me to send to other ships. Fortunately, however, I afterwards found myself in a position to make reprisals on the Admiralty, as, on passing through the Downs, and being senior officer, I was enabled to complete from the dépôt ship there, which was then full of picked men. I only mention this little anecdote because it reflects the sort of scrambling which, I fear, is likely to be repeated again if war should break out and find us in our present position; and because I find that these sea-coast volunteers, from which our 2nd class Reserve men are now enlisted, in a very short time became most efficient men-of-war's men. I venture to assert that, with sufficient encouragement offered as regards pay and pension, and with sufficient training, our present 2nd class of Reserve men could not only be rapidly increased in number, but become an efficient reserve for the navy. These men are accustomed to small craft. They have their sea legs; they are always ready at hand, and could be given any amount of training as gunners. I cannot see in what respect they would be inferior to the 1st class Reserve men; in fact, I question whether, in point of discipline, they would not be superior. I can only say that, for my part, if equally trained, I would prefer that class of men, but at the present time they are under-rated because they are under-trained. Besides, it cannot be expected that the best of our sea-coast population will volunteer for the 2nd class Reserve when they are not treated in any respect so well as those who are enrolled in the 1st class; and our war ships having now dispensed with masts and yards, I cannot perceive why they should continue any longer to be thus trea'ed, for it is mainly now a matter of training to arms—which is wholly a

question of money—and not of seamanship. We hear a great deal about the difficulty of manning a navy. That may be true as regards officers, but I stoutly maintain that it lies solely in the indisposition to pay for what is wanted that we do not get the reserve we require; in fact, that an ample reserve force is not forthcoming. I think this is a question vital to our naval supremacy, inasmuch as all other points of fighting efficiency being equal, it is reasonable to assume that the fleet which is strongest in point of a reserve of gunners to take the place of those who are disabled, will come off victorious. In that respect how do we at present stand, as compared with other naval Powers? The peace complements of their ships are larger than ours, and on an outbreak of war they have ample reserves with which to increase them. If we only consider the readiness with which large sums of money are provided for educating the rising generation, reaching up to a high standard of literary and technical attainments, it is in marked contrast to find how money is stinted when sought to be spent for the training of young men in the service of national defence. Why should not all school fees be paid to training schools for the navy as well as to the Board schools? Why should money not be forthcoming for school-ships as well as for School Board buildings? Surely the discipline and technical instruction of a training ship as a school is of higher value to the nation than any ordinary school teaching. I have, however, already trespassed too long on the indulgence of this meeting. I therefore conclude by saying that the point I have raised is in support of a large and immediate increase of our 2nd class Reserve men, supplementary to the adoption of the reforms proposed by the lecturer—to all of which I can agree—for restoring the national prestige of our mercantile marine, its nationality and its efficiency as an arm of defence for our Empire.

Captain RATHRER: My Lord Brassey and gentlemen, I did not come here to-day to speak; I have not had time to study the subject, but I have listened with great interest to the lecture by Lieutenant Crutchley, and I agree with all that he has said. I am not one of those that believe at all in the deterioration of the British Navy. I think the British seaman is as good to-day as ever he was. If he no longer learns seamanship that has become obsolete, he learns a lot of other work that is suitable to the more modern vessel. I have not studied the question whether the Reserve is sufficiently strong or not. If it is not sufficiently strong I think we are all agreed it ought to be strengthened, and that more inducements should be held out to the best men in the merchant service to join it. I can tell you a story that I know occurred during the Russian scare in 1855. A ship, commanded by an old shipmate, a great friend of mine, was taken up by the Admiralty as an armed cruiser. She was all but commissioned; she was coaled, armed, and ready to hoist the white ensign at a moment's notice. The captain asked the crew, man by man, if they would volunteer in case the ship was actually commissioned, and there was not one man that would volunteer. I do not think it was because they did not want to fight; I think each man wanted to sell his services as dearly as he could. If all those men had belonged to the Reserve, and if the Reserve been called out, they would have had to go.

Vice-Admiral COLOMB: My Lord, I do not rise to speak on my own account, because the subject is one on which I have not got any distinctly-formed opinions; but I have had a letter from Sir Geoffrey Hornby expressing his regret that other engagements prevented him from taking the chair at this meeting; and although we should have been pleased to see him here, his place is most efficiently filled, so that we need not, so far, regret that. He being unable to attend himself has asked me to put forward, as well as I could, his views upon this subject: and I am sure you would very much rather hear his views than mine—if I had them. He says: I was asked to take the chair next Friday at the lecture that Lieutenant Crutchley, of the Royal Naval Reserve, was going to give at the Royal United Service Institution on 'National Methods for securing a Supply of Seamen.' I am sorry I cannot do so, as the Drawing Room is announced for the very hour he is to begin, and the meeting of our County Council is fixed for the same day at Horsham; so that I am caught on one horn or other of the dilemma. But I hope you, and any other reasonable men, will get there and speak plainly, and to this effect. First, that it is not sufficient for a man to go to sea to become a seaman fit for war. He

must be trained for fighting purposes. A very important matter is that he should know and trust his comrades. Under the wise law that Cromwell gave the country, men were so trained by compulsory apprenticeship, and were prime seamen. When the country accepted Bright and Cobden's travesty of the great traditions that Adam Smith preached, they induced the country to abolish that wise law, so as to diminish the cost to shipowners, as others sought to lower wages for the benefit of manufacturers. Now it is impossible, so far as anyone can see, to re-establish our apprenticeship law with such an apprenticeship law as can be fair to the two mercantile navies, that is, to the sailing navy and to the steam navy, because, though seamen trained under sail are supremely useful on the decks and at the helm of a steamship, men trained in steamships as stokers, &c., are absolutely useless in sailing ships. I am writing now only of men of the forecastle; I do not allude in the slightest to officers of our large steamships, who I hold to be as good as they were, or can be; indeed, I hold that recent events fully confirm the late Admiral Hewitt's remarks to me, when he came home in the 'Servia' on her trial trip, which was, 'You and I know nothing about it.' I think three very recent events endorse that opinion. First, there was a first-class ironclad started for Gibraltar, and found herself at Queenstown; secondly, there is the 'Normania'—I think I am right in the name—put on to drive against the heavy weather in the North Atlantic, and she washes away half her upper deck. The 'Lucania' comes home against the teeth of a heavy easterly gale, and her shortest day's run is 364 miles; that is, the officers of the Cunard Company can drive across the Atlantic in gales of wind at a rate of 15 knots, and we cannot drive as far as Gibraltar. What is the qualification to take charge of only a watch in a Cunarder? That the man must have commanded a sailing ship two years. . . . John Burns has told me repeatedly that our first-class petty officers to whom we pay 3*l.* 5*s.* a month, they would gladly give 5*l.* 10*s.* or 6*l.* a month. Now then, no one has shown how, except by the old system of apprenticeship which is unattainable, foremost men of any value can be made. We are proving, day by day, that we can train men most valuable to the mercantile marine in our navy. All we want is a Mr. Squers, who, after showing how it is to be done, will say to Her Majesty's officers, 'Now, go and do it.' They have got only to look to the leading nations of the Continent and adopt their approved system, that is, regimental embodiment of young men and boys in localities, these localities being the great seaports Hull, the Tyne, the Firth of Forth, Aberdeen, Glasgow, Liverpool, Manchester-upon-Sea by-and-by, Milford Haven, Bristol, Falmouth, &c. And as to the regimental system, remember this, the First Royal Regiment may be sent to the West Indies. If it should, some companies of it may be sent to Bermuda, others to the Bahamas, but the regiment exists as before; and therefore I cannot see why the 35th crew, being a Liverpool one, after serving for two years in the Channel Squadron, should lose its existence because its officers and men are embarked in the . . . 'Alarm,' 'Alert,' 'Antelope,' &c., and sent for three years to China, or the Pacific. I look on this occasion, when a Naval Reserve officer comes forward and says we have at present to rely upon a haphazard selection of absolutely untrained men, as a most timely one. He has seen men-of-war, and knows what untrained men would be exposed to in action there. He has seen, also, how well our men are trained. Now, he says to me, "Just pull yourself together, and spit it all out straight." I have obeyed my late Commander-in-Chief's order, and I think there is very much most valuable good sense in what he says, that that matter of comradeship, which he speaks of, is really an important question, and, if you could draw together by any means the seamen at such ports as he mentions, and form them regimentally, and if you pass them for a time through the navy, giving them advantages, and spending a little money upon them, I think that would go far to remedy the defects which have been so exceedingly well pointed out by the lecturer to-day.

Sir GEORGE BADEN-POWELL, M.P.: I may say at once the great relief it has been to me to come out of the atmosphere in which I have just been in the House of Commons, and, if I may say so, with due respect to that great body, to come into an atmosphere where I find something practical going on—something in the way of discussion, which I hope will lead to real, practical result in one of the greatest interests with which we can possibly deal. I have listened with great

interest to the able paper which has been read. One of its special points of value is the information it has given so clearly as to what foreign nations are doing in the important subject-matter of the address. I suppose it is best for each speaker, more or less, to confine himself to one point, and the point to which I will confine my few remarks is one in which I have taken a very great interest; it is that our mercantile marine is a field from which to recruit our navy in time of need. I take it that that point affects the main argument of the lecture, namely, the manning of our mercantile marine, in a very great degree; because, in my opinion, one formed after a very considerable experience in these matters, the manning of our merchant navy will be greatly enhanced in popularity by the fact of its closer connection with our Royal Navy as one of the items or portions in the defence forces of our country. I lay that down as an axiom, and, therefore, although I take up that one point, I am also assisting in the general discussion of the question of the manning of our merchant navy. I wish cordially to agree with the lecturer in what he says as to the character of the men whom we require in time of war in our merchant navy. I think he has given us a very excellent phrase in that of "seamanship . . . . because, after all, as many of us know—and I am sure Lord Brassey will endorse what I am saying—there is, as it were, a new seamanship that has sprung up in this age of iron; and I take it it is just as good seamanship to bring a steam launch alongside an ironclad when she is rolling in a seaway as it would be to bring a row-boat or a sailing boat; and in the handling of an ironclad, just as much seamanship is shown both in manoeuvring and in any other operation as was ever shown in the days of sailing ships. There is another form of seamanship to which I would specially allude, and it is a form which I suppose, owing to having so much to cover, the lecturer could not deal with, that is the special form of seamanship shown by men below decks. Many of us have been perhaps on an ironclad, certainly on a smaller vessel, when we have known that, unless you have sea legs down below, not only absence of sea-sickness, but capacity for work while the ship is knocking about, you are of no good below. There are various ratings on our ships which I think are liable to suffer eclipse, because they have not the name, so dear to the British public, of "blue-jackets," or seamen. We have had many instances, and I do not doubt, in war-time, many more instances would follow, in which the safety and efficiency of a ship has been largely dependent on the powers of those below deck to carry on the work of the ship in a seamanclike manner. There was the one particular case of Captain Kane in the hurricane at Samoa, when his ship was saved, as he himself said, almost entirely by the steady, hard work done by the engine-room staff and those who were below deck, who knew nothing of what was going on above, but, like true British seamen, were enabled to carry on their work, and do their duty, and to obey orders. I believe in the next naval action—and I do not say this except as I have heard it from the best naval experts whom I have come across—it is below decks that we shall find the true training of the men will tell most. They will no longer be able to see what is going on; they will have no idea what is happening, but they will have to carry forward their duty under the most severe circumstances you can conceive, requiring nerve, and calmness and coolness, as well as bravery, and I believe it is below decks where we chiefly wish and want to train the men of our mercantile marine in actual service in time of war for our navy. I know, and I have seen myself from converse with the men of the Royal Naval Reserve, that they are very anxious to be, as far as possible, more assimilated to men of the Royal Navy. I myself had something to do with an item which perhaps affects sentiment rather than any practical point, and that was when there was a proposal, which was supposed to be looked upon favourably by the Admiralty, to substitute guernseys for jumpers; but with regard to the feelings of the men they were strongly averse to giving up even that nominal and outside evidence of their connection with the Royal Navy. These details have to be attended to when you are dealing with these men. I have gone elsewhere into full details as to other points in connection with the Royal Naval Reserve, such as pensions, training, and of discharge certificates; but what I should like to say is, in dealing with these matters, we must not forget that we are not only dealing with the deck hands. Perhaps one of the most important divisions of the Royal Naval Reserve, and one of the most important

aids that it can give to our navy in time of war, is the provision of trained engineers, artificers, and stokers, and I do hope that may yet receive the full consideration it deserves. I happen to represent one of the divisions of Liverpool in which the docks are situated, and I have, I am happy to say, a large acquaintance, not only amongst seamen, but amongst the engine-room men of the big Atlantic liners, and I do feel strongly that the firemen, as they are called in these ships, would volunteer to join the Naval Reserve in far larger numbers if they were assured that their position on a man-of-war would be, as they say, more on an equality with men of the Royal Navy in their respective ratings. They are very anxious that they should be trained in the use of fire-arms and in drill, so that they should feel, at all events in time of need, they might form part of the combatant force of the ship. I have offered these few remarks because I feel very strongly on this subject. There is a Committee being appointed now, I believe, on the under-manning of ships. I think it is of the greatest importance to this country that on that Committee the various sections of our mercantile marine should be adequately represented by trusted men. There are very many divisions of the mercantile marine, and I consider one of the greatest of those divisions is that connected with the Royal Naval Reserve, because in the years to come, and I hope in one or two years, we must devise a complete system of co-operation between the navy and the mercantile marine, so far as the defence of our Empire is concerned; and in that respect I do hope that on this Committee we shall see the views both of officers and men of the Royal Naval Reserve fully and capably represented. I would only add that I have always had an extreme interest in the Institution under whose roof we are met to-day. My grandfather, the well-known Admiral Smyth, was one of those who assisted to found the Institution. I have always valued very much myself the information it gives, especially to Members of Parliament, on these technical matters, and I do think that this present discussion, which I hope will be reported in the Journal so that every Member of Parliament can get access to it, ought to have a very valuable effect in forcing Parliament to take up this very practical question, and, so far as the powers of Parliament lie, to see that there is a closer co-operation and a growing union, both of sentiment and practice, between the Royal Navy and the mercantile marine, as a recruiting ground for the Royal Navy in time of war.

Mr. E. L. LOWDELL: My Lord, ladies, and gentlemen, all the points I wished to touch upon have already been mentioned, but I might say a few words about the officers of the Royal Naval Reserve. I have had the pleasure on one or two occasions to serve with them, and the complaint has been that the captains of the different ships would not allow them to perform the ordinary duties of their rank. They are sent as a rule to take the place of lieutenant, in fact, I think you will see a remark to that effect in the Navy List "In lieu of lieutenants." In one ship I was in the Naval Reserve officer was not permitted to keep watch at sea, whether in company with the squadron or alone, nor to take charge of a dockyard party, nor to watch the case on behalf of a man at the police court, nor to take his turn of guard or picquet. The consequence was the lieutenants had to do extra work. If a Royal Naval Reserve officer is sent to a man-of-war to learn his duty, how to do it and how not to do it, he ought to have the opportunities given him to do so, and not be thrust out of sight and kept out of the way. The captain of the ship I was serving in was superseded, and sent to a home appointment; his successor, I regret to say, did exactly the same with regard to the Reserve officer. Only last week a lieutenant belonging to one of our home ships was recalled from leave by telegram to rejoin his ship, the Royal Naval Reserve officer not being considered competent. I maintain this is a slur upon the officers of the Royal Naval Reserve. Either they are able to do the duty of the naval lieutenants or they are not, and if they are sent by the Admiralty to do the duty of naval lieutenants they ought to be allowed to do so, and to be given the chance of learning the routine of a man-of-war. If the Royal Naval Reserve officer be incompetent try him by court-martial and get rid of him, but by all means give him a trial, because it seems to me that at present we are paying a high price for a bad article. As to our Reserve we have none, and no amount of after-dinner speeches will convince me to the contrary.

Vice-Admiral NICHOLSON: I think everyone will agree with me that when we have such a distinguished Chairman it is our duty to start every hare to let him hunt them down in his closing remarks. The paper which has just been read is one of immense importance, and the speeches up to the present time certainly have been worthy of the occasion. We must all have agreed with the remarks from Sir George Elliott. Like him, I had especially wished to point out the value of our fishing and coasting population as reserves for the navy. At the time that he alluded to, when ships were fitting out in a great hurry, I had the honour of serving as gun-lieutenant in a 90-gun ship commanded by a distinguished officer who I have now the pleasure of seeing here, and it was one of the happiest times that I passed in the navy. We had 870 men on board, but only eight seamen gunners! and two gunners' mates, and could not get any more! We left the Nore and went to Spithead, and in a very short time afterwards we beat out from Spithead against a lee-running tide and a stiff breeze, and in a few months we joined the Channel Fleet, fit to do anything that any ordinary ship was at that time required to perform. Therefore, I venture to say that all we hear in the present day about the necessity of ships being manned with only highly-educated seamen is hardly reasonable. I admit to build a ship in the present day is a difficult matter, and the arrangements being very complicated you require to have good officers and a certain number of selected men. If for a ship's company, to the ordinary complement of seamen gunners, we added half the balance of blue-jackets, trained men-of-war's men, and the other half men from the Reserve, I think in a month's time they could be made into a very good ship's company. As regards the present Reserves, I would ask could there be finer material than the fishermen and yachtsmen on the English coast? But when they are asked to join the Royal Naval Reserve, and they are called 2nd class men, surely this is not the way to encourage *esprit de corps* and the proper feeling of self-respect in these men. Surely they are influenced by matters like that referred to by Sir George Baden-Powell, where he spoke of men of the Reserve thinking the guernsey was rather a badge of the merchant service forced upon them, and resenting the fact that the open dress of the blue-jacket was taken away from them. That shows what their *esprit de corps* is, because, undoubtedly, the jersey is by far the more convenient and useful dress to wear. If more men are wanted in the Reserve—the thing appears to be quite simple—treat the men, especially in matters that affect their *esprit de corps*, with consideration, and I am sure the spirit of the country will always respond. We need not refer to the German or the French Regulations as our guide in this matter. We have a magnificent seafaring population, and I feel convinced that with some small modifications of our present system, such as I have indicated, no difficulty will be found in recruiting from it a powerful and dependable reserve.

Lieutenant W. BADEN-POWELL, R.N.R.: In speaking to this paper, after so many able speeches, we practically have had all the wind taken out of our sails; but at the same time, though a great deal has been said that I would possibly have said if I had risen sooner, I do feel that we have been going rather off the track. In my own opinion this is a question not of whether the gold in the sovereign is good, but whether we have got sufficient sovereigns in the bank to draw out when we want them. As I read the paper, the question is this, Is the mercantile marine of the day in as good a state as it ought to be to give a sufficient supply of men to man the navy in time of war? This paper is most opportune in regard to the Committee which my brother, Sir George, mentioned just now—the Under-manning Committee which the Government have at last set on foot, because if the members of that Committee and the Government will take the trouble to read the paper and the discussion, I think it about as fine a basis upon which that Committee can start as any man in this room could wish to have. We have practically two papers before us, for Sir George Elliott's speech amounted to a paper, and held a good many points which Lieutenant Crutchley's paper did not hold, and was most valuable. The facts are there, the suggestions are there, and the Committee's duty will be to look into the facts and see if they cannot be put upon a proper footing. One thing that struck me very much in reading the paper was, in the first place, that if we were never going to be at war there would be no reason to touch the

question of the mercantile marine; we could let owners employ what kind of men they liked; but when you come to look at it and see that, unless you can conserve to a certain extent the manning of the mercantile marine, we shall by degrees with these—I might almost say, infernal unions which bring undiscipline into the mercantile marine—by degrees get our men and officers almost entirely from foreigners. It will only be the big lines—the Atlantic liners and Indian ships—that will go to the expense and trouble of risking the strikes of the British seamen, whether of officers or of men. I am, therefore, strongly of opinion that Lieutenant Crutchley has touched the right point when he says he is frightened of seeing the merchant service being entirely in the hands of foreigners—that masters and mates may be foreigners. And then he reminds you, quite correctly, that we are still under the old system of the press-gang. In war on foreign stations, where the naval authorities may have the benefit of calling out the Reserves and of using the old time press-gang, they will go on board ships and take what British seamen there are to be found, and if the masters and mates and two-thirds of the crew are foreigners, if the press-gang takes out the remaining Englishmen, where are we now? If that ship is entirely in foreign hands in time of war it would be the most dangerous condition, both for owners, underwriters, and the country, that our mercantile marine could get into. It is all very well to say we could lay the ship up, keep her in port, but any cruiser belonging to the enemy may slip in and take the whole lot, especially if they are not manned by British seamen. These are points which should come up in regard to the manning of the mercantile marine under the work of this Committee. There is one other point. It seems to me the Government is always trying to catch fish without any bait on the hook. They call for a moderate amount of naval reserves. We say, many of us, not half what ought to be called for in this country for that proposed magnificent fleet which we have already, in the face of a great deal of calling out, agreed to build. They keep the Naval Reserve not half up to the amount of what it should be, and they offer no solid inducement to tempt the best men to enter. I believe the British manning of the mercantile marine would be increased at once if it was found that by going into the mercantile marine men could go into the Naval Reserve, and thereby ensure themselves a really good pension. In that case there would be a security for them in their old age and for their widows; and the pension should not be dependable upon war, but should be simply there as soon as the man is enrolled on the books of the Royal Naval Reserve. That pension should be taken to a certain extent from the pay with the addition of a certain amount of money from the Government, and the men should have to go through the mercantile marine in order to get it. That is a point which should be very carefully considered and advised upon by this Committee that is about to be appointed, because otherwise it seems to me the permanent officers of the Admiralty may never see it, and certainly the Treasury will work in its old way against supplying any more money to this country except upon great pressure of public opinion.

Lieutenant CRUTCHLEY: I do not know that there is any point that I wish to reply to upon the remarks that have been made. This paper was simply written as a peg to hang an able discussion upon on the subject of manning the navy, and I am pleased to see that we have had such a discussion.

Lord BRASSEY: Gentlemen, it is now my agreeable duty to move a vote of thanks to Lieutenant Crutchley for his most able paper. I am sure that Lieutenant Crutchley will appreciate it as the best form of recognition, that the paper has been so ably discussed by the numerous speakers who have addressed us. Lieutenant Crutchley has been dealing this afternoon with a subject of the very highest practical importance. We are building, and I rejoice that we are building, very largely for the navy at the present time. We have been adding largely to the fleet during the recent years that have passed by, and I hope that the policy of maintaining and increasing the navy, and keeping it in a position of superiority to any possible rivals upon the sea, will be sustained. If we attempt to provide for the manning of our largely increased navy completely by means of a permanent service, we shall incur an enormous expenditure, which has never been borne by any maritime Power at any time in the past, and which might be applied even for naval purposes to greater advantages in other directions. We must have sufficient officers and men to

give the lead to the force which would have to be created for the emergency of war. Well led by an adequate permanent force, a reserve such as we might create out of the mercantile marine would be found in the day of trial not unequal to the demands which the country might put upon it. It seems extremely desirable that the navy and the mercantile marine should be brought together more closely than at present for the training of seamen, who would find their usual employment in the mercantile marine, but would be available for the navy whenever their services were required. Lieutenant Crutchley, in a very interesting section of his paper, has called attention to the strength of the naval reserve of foreign Powers. I think we may all feel that if the Admiralty think it necessary that we should have larger Reserves than we have at present, we are certainly not without the means of raising the Reserves whenever we think fit. It is quite certain that such a Reserve as is organized in France under the *Inscription Maritime* cannot possibly consist of men who have had a large experience at sea in sailing ships of the first class. The great majority of the men in the *Inscription Maritime* are men whose experience at sea has been gained in connection with fisheries. Those are precisely the men that we have enrolled in our second class Reserve. Many officers have told us this afternoon that they would be quite satisfied with a Reserve such as we may recruit from our fisheries. All that we want is to give them an adequate training in gunnery, and adequate experience in vessels of war. If we are to train a very much larger Reserve than we now possess, and give them such a training as is given in the German Navy, in the French Navy, in the Italian and Russian Navy, it is evident that we shall have to do this by substituting men from the Reserve for temporary service in the place of those continuous service men whose presence on board ship is no doubt extremely agreeable to officers. That is a point which has to be considered. If we are to train them as thoroughly as they are trained in these foreign navies, we must do it by the same system, that is, by having a larger proportion of the crews of our ships in time of peace provided from reservists, and therefore substituted for an equal number of continuous service men. I dare say such a change as that might be an advantage from a natural point of view, that is to say it would give us a greater power of expansion in time of war. It certainly would involve greater trouble to naval officers than they now have with their ships entirely manned by continuous service men; it is a question of trouble, and it is a trouble I am sure officers would cheerfully take if it were shown to be necessary. The lecturer has spoken of the increasing proportion of foreigners in our merchant service. We all regret it, but we all know the reason why. If you look at the question from the practical point of view you must see this, that with wages on the scale which is now paid in the merchant service, you can hardly expect to get the cream and flower of your working population to go to the merchant service to bear all its hardships and its fatigues, privations, separation from home, and all the other disadvantages which have to be borne, when the pay is so much less than that which is obtainable in the skilled trades on shore. The fact is, our merchant service is recruited from among the English population, I believe very largely by boys, who are attracted to the mercantile marine by the spirit of adventure. If they look to this thing as a matter of £ s. d., it is perfectly plain it is far better to acquire a knowledge of a skilled trade on shore than to go to sea for the wages now obtainable in the merchant service. Fortunately there is the spirit of adventure, there is the love of the sea, and that takes a very considerable number of boys to sea quite irrespective of the question of wages. I should like to refer to one or two practical points. We have ample means of recruiting for the Royal Naval Reserve in any numbers which the Admiralty may conceive to be necessary. The applicants, as we know, are numerous, and their qualifications are very carefully considered before men are enrolled. But when we turn to the training of the Reserve man after he has been enrolled in the force, it can hardly be contended that there is nothing left to be desired. Now batteries on shore are the principal places of training for our Royal Naval Reserve men. Our batteries are, no doubt, very useful for training purposes, but the men who have only received their training in batteries would certainly have much to learn if they were called upon to serve in a modern vessel of war. Every Reserve man should, if possible, be called upon to serve afloat annually for a short time in a seagoing ship. That of course would involve

increased pay and allowances, but I think the expenditure would be fully justified by the increased efficiency of the men. Then we have to consider this, do we do enough to give rewards for superior efficiency in drill and gunnery to the Royal Naval Reserve? In the permanent force of the Royal Navy, good conduct and attention to drill are rewarded by a most elaborate scheme of ratings, and conduct pay and badges. To the Naval Reserve man the only reward for superior efficiency is the penny a day while on drill as a trained man. The ordinary pay and allowances, as at present established for the Naval Reserve, are liberal, having regard to the limited amount of service which is usually required, but it is a question whether some classification of the Naval Reserve men is not desirable. The retainer might be fixed at a somewhat lower scale than at present for newly entered men, increasing to something more than the present scale for men of meritorious conduct, and thoroughly efficient in gunnery. Such a classification might do much to encourage efficiency without adding largely, if at all, to the total expenses of the country. A careful consideration of the regulations with reference to the embarkation of seamen for limited periods of service seems urgently called for. Is it proper to leave it entirely to the option of the Reserve man whether or not he shall respond to such a call as the Admiralty has lately made? Would it not be desirable that there should be a power to call upon men to serve for short periods whenever they are really wanted? As an inducement to enter into an engagement to embark, something should be added to the present scale of pay for men. The pay of an able seaman of the Royal Navy is 1s. 4d. a day, or 29/- a year, for continuous service. Those rates are considerably below those paid in the mercantile marine. The Royal Navy offers great advantages irrespective of the pay, but those advantages would not be within the reach of men serving for short periods. The Naval Reserve would, I contend, be far more efficient if all the men in the Reserve had been trained in the navy. How are we to bring that about? Training ships for destitute boys cannot supply a large number of desirable recruits for the mercantile marine. The Royal Commission on manning recommended that 12 training ships should be established at the public expense at the principal commercial harbours for the recruitment of the mercantile marine and the Royal Naval Reserve. These recommendations have never yet been acted upon. Then we have a later authority than the Report of this Royal Commission in support of the policy of establishing training ships at the great ports: we have Sir Geoffrey Hornby. What he desires is that there should be harbour training ships at all the large seaports, in which boys from the adjacent counties should be placed. After the training of these boys is completed, Sir Geoffrey has recommended that they should go to the navy for three or four years, and after their service in the Navy join the Naval Reserve. We should be doing good to the mercantile marine by leaving it with these more highly trained men, and we should be establishing a Naval Reserve far more efficient even than the present Naval Reserve. The only thing which stands in the way is the question of expense. I cannot doubt that the very valuable paper which has been read to us will be a help in pushing forward a movement such as I have endeavoured to indicate. When I was at Calcutta at the end of last year for two months, I had the opportunity of becoming a member of the International Shipmasters' Club, and of having a good many useful and interesting yarns with gentlemen who were kind enough to regard me as a brother shipmaster. It always came to this, that seeing that we have abolished apprenticeship, and all those arrangements of the past, there is a great difficulty in training men for the sea service in any systematic fashion. I quite recognise that with the hard struggle which competition has brought to the ship-owners, it is very difficult to get them to look upon any expenditure which is not absolutely compulsory, and which does not bring to the individual incurring the expenditure any immediate personal advantage. If you want things done for the national advantage, the nation must do it. That is the fairest way of distributing the expense. I have very much pleasure in conveying your thanks to Lieutenant Crutchley for his very important lecture.

*Admiral Sir E. FANSHAW:* I should like to ask you to give your hearty thanks to Lord Brassey for taking the chair on this occasion, and I am sure, after the address he has just given to us, we shall with redoubled force desire to thank him for presiding over us this afternoon.

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Friday, May 11, 1894.

Lieut.-General W. H. GOODENOUGH, C.B., R.A., in the Chair.

## LE SOUDAN FRANÇAIS, AND RECENT FRENCH OPERATIONS ON THE UPPER NIGER.

By Captain S. PASFIELD OLIVER, late Royal Artillery.

The CHAIRMAN: We have received a note from Captain Oliver to say he was too unwell to come here this afternoon, and he has requested our Editor, Captain Maude, to be so good as to read the paper for him. Captain Oliver may be known to some of you as having been for a long time identified with researches regarding French operations in Madagascar, and elsewhere, with which he has an intimate acquaintance. He has requested me to acknowledge the kind assistance which he has received from the "Temps" newspaper, in preparing the matter which will be brought before you.

BEFORE giving a sketch of the recent advance of the French military and naval forces along the course of the River Niger, of their successful occupation of Timbuctou, and of the consequent establishment of their influence throughout the length and breadth of the vast Sahara, it may be as well to trace the development of French authority over that extensive region, now comprised under the modern name of the French Soudan, but which formerly was merely a prolongation and dependency of the colony of Senegal, when it was known as *le Soudan occidental*.<sup>1</sup>

### *Senegal.*

The term Senegal is, at present, applied to the country formerly known as the French Senegambia, and is generally reserved to the territory in the immediate neighbourhood of the lower and navigable waters of the great River Senegal. This important artery is the largest river which, skirting the southern fringe of the Sahara deserts, forms therefrom a convenient outlet to the Atlantic sea-coast; for the route *via* the Niger from the same country is long, circuitous, and unhealthy, whilst the French port of St. Louis is, by many days' voyage, far nearer to Europe than the ports of the Niger Delta. North and north-east of the River Senegal is a rainless dis-

<sup>1</sup> The "Bled-es-Soudan," or "Country of the Blacks," being the Arabic term for the region drained by the numerous affluents of the interior river system of West Africa, most of these taking their rise in the elevated plateaux of the Fouta Djalon and the highlands of the so-called Kong Mountains.

trict, but south and south-east lies a fertile country, watered by an abundant periodical rainfall. Its most distant source is in the heart of the Fouta Djallon, where, under the name of Bafing, or "Black River," it takes its course from springs some 2,500 ft. above the sea and runs at least a thousand miles in a circuitous track to its mouth; at first flowing north, at Bafoulabé, or "The Two Rivers," its stream is joined by the Bakoy, or "White River," of nearly equal volume, the product of various tributaries from the east. From this confluence, at 470 ft. elevation, the Senegal flows north-west, over many cataracts and rapids, between precipitous banks to Médine and Kayes, where it receives the waters of its chief northern affluent, the Kuniakari, and, becoming navigable, flows steadily on to Bakel, there it is joined by a southern affluent, the Falémé, at 300 miles from the mouth at St. Louis, where its waters have thrown up an extensive bar and are merged in numerous lagoons before joining the ocean.

### *The People.*

North of the Senegal (and of the Niger, further east) the country is inhabited by two distinct races, comparatively fair (as opposed to the Negro), viz., the Berbers, the supposed aborigines of the Atlas plateau, and the Arabs--intruders from the East since the days of Mahomet. The people, mostly nomad, which have sprung from the cross between these races and the blacks, are designated, indiscriminately, as Moors. Another race, not dissimilar in many respects to the fellahs of Egypt, form, however, the bulk of the population between the 10th and 18th degrees of latitude, known as *Peuhls*. In some States these *Peuhls* dominate over the blacks; in others they keep isolated, and lead an independent, pastoral life. In many places they have allied themselves with the black race, and the result has been a mixed type known as *Toucouleurs*, i.e., "two colours," a foreign designation which attests the lasting impression left by the British, during their occupation of St. Louis from 1758 to 1779, and again from 1880 to 1817. Of the negro races further south it is impossible to enumerate all the varieties, whose name is legion; it will suffice to state that the Ouloofs are the finest in physique, and have furnished good material for native troops to the French. The majority of the black people, however, belong to the Manding, Malinka, Soninka, and Bambara tribes, from the left bank of the Senegal.

The origin of the French colony of Senegal has been ascribed to the establishment of a trade with this part of Africa by the mariners of Dieppe as long ago as 1364; but it was not until 1626 that a factory was permanently established on the little islet of St. Louis at the mouth of the river. The numerous vicissitudes of this possession need not be recounted; it was finally acknowledged as French territory in 1814, and for a long time but a modest traffic was carried on between this port and the port of Bordeaux. Under the Bourbons and Louis-Philippe the French military ports only extended to Richard Toll and Dagana. It was not until 1854 that expeditions were first pushed up the river by Captain Protet as far as Podor;

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<sup>2</sup> The p

and after the Crimean war posts were established as high as Médine (where the Senegal ceases to be navigable) by General Faidherbe, who succeeded Protet in governing Senegal successfully. Under his beneficent rule, works of all kinds, bridges, roads, telegraphs, lighthouses, schools, barracks, were undertaken at St. Louis, at Dakar, and in the island of Goree, transforming these places into veritable European towns, thereby rendering them habitable and even attractive to French residents.

At this time a Mussulman chief began stirring up the tribes of the Western Soudan against the increasing power of the Europeans on the coast; and, as the contemporary history of the Soudan Français hinges almost entirely on the fortunes of the dynasty established by this powerful potentate, it is necessary, in order to understand all that has occurred in this region during the last two decades, to possess some slight acquaintance with the origin and rise of this personage—El Hadj Omar and his family.

### *El Hadj Omar.*

El Hadj Omar was a Toucouleur, that is to say, he belonged to that population which inhabits the Senegalian Fouta, which race is a cross between the Peuhls and the people of the middle and upper Senegal. Omar was born at Aloar, a village not far from the present French post of Podor (just above the Delta of the Senegal), and, as his name indicates, had made a pilgrimage to Mecca, on his return from whence he settled in Senegambia, fixing his residence in the Fouta Djallon, where he soon acquired a high reputation as a Marabout—a fanatic saint or Fakir. About 1848 he moved eastwards to Dinguiray (on the higher waters of the Niger), and there he began to assemble some of the "Faithful" as military followers.<sup>1</sup> When he had recruited a following strong enough, he constructed the fortress of Koundian, in the neighbourhood, and on the left bank of the Bafing river (which is the highest tributary of the Senegal), due north of Dinguiray, and half way between that village and Médine, which might serve him as a base for his contemplated raids and conquests. [Dinguiray is in some measure a vassalage of Fouta Djallon, and Koundian belonged by right to Omar—being his property.] Having completed his fortress, Omar at once commenced to summon the "Sofas" to war against the unbeliever, and proclaimed a "Jehad." To his appeal all the available warriors of the neighbouring regions readily answered, and taking up their arms placed themselves under his command, and in 1854, at the head of 12,000 combatants, he commenced his campaigns by conquering Bambouk,<sup>2</sup> and several independent provinces on the banks of the Upper Senegal. In less than three years the whole of that country situated between the middle Senegal and the upper waters of the Niger had submitted to him, and he

<sup>1</sup> The armed horsemen are known throughout the Soudan as "Talibés," the foot warriors as "Sofas."

<sup>2</sup> The province between the Falémé and the Bafing rivers.

established himself at Nioro, the capital of Kaarta, the country which commands the commercial line projected by General Faidherbe, between the French colony of Senegal and the Niger River. Having attained to this high position, influence, and power so rapidly, Omar now believed himself strong enough to attack the French, who, under the guidance of General Faidherbe, had by this time pushed forward their military outposts along the banks of the Senegal, to facilitate the transit of the commerce between their colony and the interior of the Soudan. In April, 1857, the Hadj advanced to lay siege to the French post at Médine, then defended by Paul Hol with 7 Europeans and some 50 Senegal native troops and *Lapiots*, native boatmen of the Senegal. After a siege of 97 days, Omar was obliged to retire, after having been defeated in two encounters with a relief column despatched as soon as possible by Faidherbe, and the colony of Senegal was thus saved from imminent destruction.

A distinguished engineer, M. Duponchel, had already proposed the establishment of a railway across the Sahara, to bring Algeria in communication with the populations of the valley of the Niger; but General Faidherbe advised another route, which would start from the point where the Senegal ceases to be navigable (*i.e.*, the post of Médine), and traverse the interval between the upper waters of that river, in a south-east direction, and the higher navigable stream of the Upper Niger, at Bammako, distant some 300 miles or more. This project of General Faidherbe was fully explained in the instructions which he gave to Lieutenant Mage, when he sent that explorer to reconnoitre the Upper Senegal and the Niger in 1864:—"The object," he wrote, "will be to create at the proper time, whenever the orders to that effect may be given, a line of posts at intervals of some 30 leagues between Médine and Bammako, or some other neighbouring locality which may appear more convenient to establish a commercial base and entrepôt on the River Niger."

Lieutenant Mage fixed upon the village of Kita as one of the points where a convenient post might be established, and he returned to St. Louis, after having lived (under compulsion) at Ségou for more than two years, under the protection of Ahmadou, the son of the celebrated Mussulman chief, El Hadi Omar, who had just died.

## FIRST PERIOD.

### *Operations against Ahmadou and Samory from 1879 to 1888.*

In 1879 M. de Freycinet formed the celebrated Trans-Saharan Commission, which was instructed to draw up a programme for the best means of pushing French interests inland, and for carrying out exploration towards the Central Soudan; and the line of posts, projected by General Faidherbe, was eventually formed by Colonel Borgnis-Desbordes, but it was not occupied without considerable trouble. It was at first thought that the natives and chiefs might be conciliated by pacific overtures and missions, and, indeed, from previous experiences this appeared a feasible plan. But, although

the missions of Lieutenants Piétri, Marly, Jacquemart, Monteil, and Sorin (made in 1879-80) along the lower and middle courses of the Senegal succeeded perfectly well in this respect, and although Captain Galliéni met with an equal success in the higher Senegal, as far as the neighbourhood of Kita, the circumstances were not the same when this last officer reached the line of the watershed and approached the basins of the Niger. There he soon encountered some more barbarous populations of untamable attitude, whose warriors were fiercely hostile to the French explorers.

The unfavourable attitude of the Toucouleurs and the Bambaras was still more manifest when Ahmadou, Sultan of Ségon and of Nioro, the son and successor of Omar, detained the members of the Galliéni mission during 10 months (1880-81) at a distance of some 40 kilom. from Ségon. Ahmadou had inherited the largest portion of the empire founded by his father, and his territories extended directly across the road which the French desired to trace between the Senegal and the Niger. The Toucouleur chiefs, the councillors of Ahmadou, reminding him of the wars which Omar had waged against the French in Senegal, in the days of Faidherbe, urged him to resist. Ahmadou hesitated to embroil himself with the foreigners, but his hesitation came to an end when he learnt that Colonel Borgnis-Desbordes, pushing on in advance, had taken the Toucouleur village of Goubanko, after occupying the village of Kita, which the Malinka inhabitants, formerly subject to the Toucouleurs, had voluntarily submitted to the French protectorate.

The Sultan of Ségon, greatly alarmed, at once signed with Captain Galliéni, on the 21st March, 1881, a Convention which gave to the French access to the Niger. Peace having been thus concluded with the Toucouleurs, it was only necessary to repress some signs of resistance exhibited by the Bambaras of the Niger Valley in order to reach Bammako (where a French post was constructed in March, 1883).

Unfortunately just at the very moment when all difficulty was thus surmounted on the line from Kayes to Bammako (along which was being constructed a section of the railway from Kayes to Bafoulabé), fresh complications arose towards the south.

One Samory, a warlike chief of Malinka origin, who had constituted a vast kingdom around Bissandougou, the capital of the province of Ouassoulou, crossed the Niger, and advanced towards the north with an imposing force towards the end of 1881. A native officer in the French colonial forces was sent to treat with Samory; but the Almamy of Bissandougou received this French envoy, Alakamessa, in such a manner, even menacing him with death, that the French troops, under Colonel Borgnis-Desbordes, at once marched against him.

On the 27th February, 1882, Samory was beaten at Kéniera, and again at Oueyako, on the 5th April, 1883, by Colonel Desbordes. At Kokoro, on the 13th of June, 1885, not only was he defeated by Commandant Combes, but his army was chased off the field and pursued with such vigour that his retreat became a veritable rout,

and the Malinka chief was barely able to continue the strife. However, it was only after the campaign of 1885-86, in which Lieutenant-Colonel Frey crushed the troops of Malinkamory, one of his lieutenants at Fatako-Djingó, that the Almamy of Ouassoulou requested for peace, and the Treaty of 1886 with Samory marks the end of the first period of the French military operations in the Soudan.

#### SECOND PERIOD.

##### *Peaceful Mission of Galliéni, and Explorations, 1886-1888.*

Having retreated to at least 124 miles south of the furthest French outposts, and occupied with the reconstruction of his army, the Almamy of Bissandougou ceased for the time being to constitute a danger to the new French establishments. Samory was busily engaged in making devastating raids to the east and south of his States for the purpose of obtaining numbers of slaves which were necessary to procure food and arms for his troops. Although this Treaty was nothing more than a temporary suspension of hostilities, it was of advantage to the French, as it prevented the British from annexing to Sierra Leone the States of Samory. An agreement was negotiated between the British agents and the Almamy, but the French Treaty of 1886 had the priority, and the British Government readily recognised the French rights under the territorial arrangement of 1889.

Meanwhile, Ahmadou had, at the commencement of 1884, left his capital and possessions on the Niger to settle at Nioro, in Kaarta, where he found himself more at home and in touch with the Toucouleur populations of the Senegalian Fouta, in nearer contact with the French posts, and better placed for making war than at Ségon. Thus, combining their efforts, Ahmadou and Samory could advantageously act against the line of the French posts, by simultaneous attacks from the north and from the south.

But, the vigorous campaigns of Commandant Combes and of Colonel Frey having pacified Samory, at least for the time, Ahmadou resigned himself to remaining tranquil, so that Lieutenant-Colonel Galliéni took the opportunity of obtaining, easily enough, from the son of the Hadj Omar, a treaty, by which his States were placed under the protectorate of France (in May, 1887), and was then enabled to devote the campaigns of 1886-87, and of 1887-88, to disembarrass both Senegal and the Soudan from the followers of the false prophet Mahmadou-Lamine. This period of calm permitted the organization of the colony, now first named "The French Soudan," to progress tranquilly; whilst the French influence was successfully propagated among the Bambara tribes, who had been almost completely detached from the Toucouleur populations. In addition, the French engineers were able to proceed with the construction of the railway from Kayes to Bafoulabé, which was prolonged by a narrow-gauge tram line as far as Diouléba at 30 miles from Bafoulabé, on the way to Badoumbé, and the village of Siguiri on the Upper Niger wa

occupied. The establishment of this new post became necessary, because, by a fresh treaty, obtained from Samory by Captain Peroz, the Almamy consented to abandon all his conquests on the left bank of the Tinkisso and on the left bank of the Niger, from the confluence of the Tinkisso (*i.e.*, at Siguiri), as far as Bammako.

Thanks to the peace which reigned in the Soudan the French Commander was able to push on his reconnaissances along the great Niger itself. The gunboat "Niger," launched at Bammako,<sup>1</sup> in May, 1884, had not been able during 1885 to get through the *marigot* of Djénné (which places the Bani in communication with the Niger), and Lieutenant Davoust, commanding the gunboat, was unable to stop at Ségou in this rapid journey. In 1887 Lieutenant Caron was more successful. He penetrated the *marigot*<sup>2</sup> of Djénné and reached Moïti, whence he proceeded to pay a visit to Tidiani, the King of Macina, in his capital of Bandiagara. Next, descending the Niger, he arrived at Kabara, the port of Timbuctou, after having taken a series of hydrographical observations and soundings, which surveys were highly useful afterwards to his successor, Lieutenant Jaime, when he again descended the Niger as far as Korioumé, a village situated by the side of Kabara.

Besides, this peace enabled Captain Binger to prosecute his enterprising journey in the country encircled by the Niger, and also permitted a military reconnaissance to be carried across the Fouta-Djallon by Captain Audeoud.

### THIRD PERIOD.

#### *Archinara's Campaigns of 1888 to 1891.*

The general situation of the Soudan became considerably modified towards the end of the campaign of 1888-89. The new Commandant, Major Archinard, of the Marine Artillery, had only to carry out the programme of his predecessor. He continued the construction of the railway from Kayes to Bafoulabé with its prolongation towards Badoumbé, and sent Lieut. Jaime to make a second trip down the river to Timbuctou. Meantime he carried out an expedition against Koundian.

Koundian is the fortress which the Hadj Omar had constructed on the banks of the Bafing River, previous to beginning his conquest of Upper Senegal and the Upper Niger. The Toucouleurs had continued to occupy it, although it was in the very heart of the French Soudan possessions, and it would have been let alone had it not been that the garrison collected, for their own benefit, passage dues on the caravans, stopped the merchants and insisted on their paying a ransom before proceeding.

<sup>1</sup> It is at Toulimando, 25 miles below Bammako, that the Niger really becomes navigable.

<sup>2</sup> "Marigot"—the channels which drain, during flood-time, throughout the rainy season, the overflows of the Niger and the Senegal, are locally known as "marigots"—they are often dry during the summer, but become broad, deep streams for several months in the year.

In the course of the year 1888, the people of Koundian were warned to put an end to these obstructions, but, in spite of this, the Toucouleurs continued their depredations, and, to the demand of their submission, which was addressed to them by Colonel Archinard, they answered by menaces. All parleying or delay was out of the question, and Koundian was shelled and taken by assault after a stubborn resistance.

Ahmadou now made his dispositions for engaging in a serious war with the French. He married all his daughters to Toucouleur chiefs, in order to ensure their adhesion; and he consolidated his alliance with Abdoul-Boubakar and Samory. The first undertook, with the Toucouleurs of Fouta, to attempt to cut the French communications with Senegal; whilst from Nioro, from Ségou, and from Bissandougou, separate columns were to operate simultaneously against the French posts on the Niger and Upper Senegal Rivers. Colonel Archinard comprehended that it was necessary to strike first at the centre, and to isolate Ahmadou from the Toucouleur States and from the valley of the Niger, by leaving him on one side at Nioro whilst he was operating against Ségou. The town, which was defended by Madani, one of the brothers of Ahmadou, was taken on the 6th April, 1890, and its fall had such an effect that the native populations of the Bambara Kingdom of Ségou came from all sides to give in their submission. Colonel Archinard respected the Kingdom of Ségou, but he declared the extinction of the Hadj Omar dynasty, and gave the sceptre of the kingdom to a Bambara, Bodian, one of those who had long adhered to the French. The Toucouleur families asked to be allowed to quit the country and to return to Senegal. This was granted, and several thousand Toucouleurs now commenced a retrograde exodus back to the Fouta of Senegal.

A French garrison remained at Ségou, where Captain Underberg was placed in charge as Resident, to control the acts of the new Chief Bodian. Besides, it was decided that the anchorage of the gunboats should be transferred from Koulikoro to Ségou, to afford the Resident the support of the crews on board the flotilla. The expeditionary column then returned from the Niger to Upper Senegal, where some serious movements were reported among the Toucouleurs of Kaarta.

In order to prevent Ahmadou going back towards Ségou, Colonel Archinard, after two hours' fighting, captured the fortress of Oussebougou, a position which commands the road from Nioro to Ségou by way of Nyamina. Then, in order to stop the eventual march of the contingents of the Kaarta towards Kayes (the French base of operations throughout the Soudan), Lieutenant-Colonel Archinard drove back the Toucouleurs, who were operating towards the valley of the Senegal, and made himself master of the fortress of Konikary, which Ahmadou vainly endeavoured to retake during the following winter.

The rainy season coming on, the campaign came to a termination for the time, but was reopened in the middle of December, when, after two fights, in which the Toucouleurs were driven back towards

Nioro, the French troops entered, on the 1st January, 1891, into the capital of the Kaarta, which the Toucouleurs, headed by Ahmadou, had just abandoned. Two days afterwards the fugitives were surprised at Youri and utterly put to flight. The most notable of the chiefs fell, fighting to the last, whilst Ahmadou fled, almost alone, into the desert, whence he calculated on being able to regain Macina, where his brother Mounirou reigned. The fight at Youri rendered the taking of Nioro complete; the whole of Kaarta made submission, and the Toucouleur families asked permission to return to the Sénégal Fouta. The emigration on this occasion was duly carried out, and no serious incident happened.

In this manner, within the space of a year, the two capitals of Ahmadou, Ségou and Nioro, had fallen into the hands of the French, and the populations, delivered from their oppressors, gladly accepted the authority of the victorious Europeans. For over three years Kaarta has now remained in tranquillity.

In the province of Ségou, however, it happened that the accession to power of Bodian had placed in antagonism two Bambara families, the Massanis (to which Bodian belonged) and the Diaras. Some few of this last-named family now formed a conspiracy to massacre the French garrison at Ségou and then to overthrow Bodian. The movement, however, did not succeed. Those of the Diaras who were compromised fled to the south in the Baninko, where a second rising occurred, which was soon repressed by one of the native agents of the French Government, Mademba. But this submission was of brief duration, and, whilst Colonel Archinard was carrying on operations against Ahmadou in Kaarta, all the Baninko again arose together with a part of Ségou proper. Bodian, old, and without great authority, was then assisting his ally Tieba, the Almamy of Sikasso, to attack the fortress of Kinian; and his troops, irritated at being led so far away, deserted and joined the rebels of the Baninko. Lieutenant Hourst, commanding the gunboat flotilla in the valley of the Bani—whither it had proceeded to try and restore order—was forced to defend himself in Diéna, which the insurgents soon began to besiege. Under these conditions Colonel Archinard hastened to direct his column—leaving garrisons in Kaarta—towards the Niger, which march was accomplished as far as Nyamina by the 18th February. Six days afterwards the blockade of Diéna was raised after a sharp fight. The losses of the insurgents were enormous, and the Baninko for a second time submitted to the French authority.

After this affair at Diéna the column returned to Nyamina. There the senior commandant gave the sceptre to Mademba, to whom was restored the kingdom of Sansanding, formed of the territories which were possessed by Ségon on the left bank of the Niger, which the Fama Bodian—old and sick—was incapable of governing together with his possessions on the right bank.

At the beginning of March Colonel Archinard resolved to push on and meet his ancient enemy, Samory, whose attitude gave cause for some disquietude.

On the 13th February, 1889, Samory had concluded at Niako with

Captain Bonnardot a treaty in which he abandoned all his possessions on the left bank of the Niger to the French. This agreement isolated the territories of Samory from those of the Fouta Djallon and from Sierra Leone, enabling the French to open up a route from the Upper Niger to French Guinea and the coast. Those who were interested in embroiling the French with the Almamy hastened to point out to that chief how the concessions he had made to the French would prevent his easily buying cattle from the Foutankas and powder from Sierra Leone. In consequence Samory, within less than three months, sent back the treaty he had signed. Steps were at once taken to induce him to reconsider his decision. Nothing, however, came of these attempts, and Samory prepared for war by now accepting the propositions of Ahmadou with a view to simultaneous action.

Upon this Colonel Archinard determined at once to begin active operations. An expeditionary column marched out from Nyamina on the 8th March, 1891, and, proceeding along the left bank of the Niger, ascended to the neighbourhood of Siguiri. On the 2nd April the French crossed the river, and on the 7th occupied Kankan, a stronghold of Samory, situated some 50 miles from the Niger, in the valley of the Milo, which the Almamy had shortly before abandoned.

Colonel Archinard, leaving a garrison here, proceeded up the valley of the Milo. On the 8th April a fight, at which Samory himself was present, took place in the ravine of Kokouna, at some distance to the south of Kankan; 1,200 Sofas were in position at this locality, and the battle was hotly contested, the French losses being considerable. Nevertheless the Africans were forced to beat a retreat, leaving on the field many Belgian breech-loading rifles, Chassepots, half a dozen "Gras" rifles, of native manufacture, and quantities of cartridges. The following day, another fight ensued, at the marigot of Diamanko, which placed the French in possession of Bissandougou, the most ancient residence of Samory, a town where the Malinka chieftain had started on his first campaign. Samory acted here in the same way he had done at Kankan, leaving only ruins behind him—having burnt everything. Pursuit was impossible, and the campaign was brought to an end for the season, two companies of tirailleurs, under Captain Besançon, remaining to hold the post of Kankan.

#### FOURTH PERIOD.

##### *Col. Humbert's Campaign of 1892, against Samory.*

Lieutenant-Colonel Humbert, who succeeded Colonel Archinard, reached Kayes on the 9th October, 1891. He first organized a scientific mission which, under the orders of the commanding engineer, Marmier, was to survey a projected extension of the railway line from Bafoulabé as far as Kita and the Niger. Having made all arrangements for this civil work, he proceeded to organize

his column, which was concentrated at Kankan by the 6th January, 1892.

On the 9th January the column set out on its march. It included a total of 1,004 combatants, of whom 144 were Europeans, together with 2,084 non-combatants and 338 animals. The artillery was composed of four mountain guns of (80 mm.) 3·15 in.; and there were 32 Lebel rifles, whilst 900 men were armed with "Gras" rifles. The French at first followed up the same route towards Sanankoro, by which the former expedition had marched, and on the 11th January they first encountered Samory's troops at the marigot of Sombiko. However, the impetuosity and dash of the French tirailleurs soon overcame this first show of resistance; they were not to be denied, and the Sofas soon fell back, only to re-form at 3 miles to the rear, at the marigot of Diamanko. Another obstinate fight here took place. At the Sombiko the French lost only 3 tirailleurs killed, and 10 wounded, whilst 17,000 cartridges were expended. At Diamanko, the fire of Samory's troops cost the French three Europeans killed, (among them Sub-Lieut. Mazerand), five Europeans wounded, and a score of natives *hors de combat*, of whom seven were killed.

Samory did not attempt to defend his capital, Bissandougou, which the French entered on the 12th January. Colonel Humbert put the town into a state of defence and sent back escorts to bring up supplies from Kankan, for the country, having been pillaged by the Sofas, was unable to furnish grain or cattle. The enemy managed to threaten and attack these convoys, but it was necessary to push on in advance. Accordingly the column left Bissandougou on the 22nd, to attack Sanankoro, whither Samory had fled. A series of fights ensued; on the 23rd at Ouassako, on the 24th at Famandougou, again on the 25th at Baratoumbo, where the enemy attempted to make a most spirited resistance; and on the 26th the column occupied the two neighbouring villages of Sanankoro and Kérouané.

The want of provisions and the difficulty of procuring them did not allow of Colonel Humbert's going further at the time, so he established his troops in Kérouané, whence numerous reconnaissances were made round about. It was learnt that Samory had collected a great quantity of "matériel" in a mountain called Toutou-Kourou, whose approach presented considerable difficulties. The attack of this place occurred on the 14th February. The tirailleurs attacked the enemy with the bayonet—the Sofas fled; and the French gained possession of the magazines of Samory, containing 70,000 cartridges for repeating rifles, 60,000 empty metal cartridge cases, and 25,000 kilos of powder, without counting smaller war materials and stores. Notwithstanding, when Colonel Humbert quitted Kérouané, on the 29th February, in order to return to Bissandougou for provisions and ammunition, he was attacked several times by bands of Sofas, and had to fight twice at the marigot of Aramont, and at the village of Komakhana. The lines of communication between Bissandougou and Kankan were likewise threatened, and here Lieutenant Belleville was killed on the 26th January. On the 9th March, 1892, a convoy of supplies, protected by a strong escort, started from Bissandougou

for Kérouané. In this second march to the south three engagements took place; two on the 10th, at Fabala, again at the marigot of Bananko, and a more serious one at the marigot of Bécéka, when 2,000 Sofas were in the field. In this encounter the French consumed 12,000 cartridges, killed 100 Sofas, and took five repeating rifles. Colonel Humbert arrived at Kérouané on the 15th, returning on the 21st, leaving at this advanced post, under the orders of Captain Wintemberger, two companies of tirailleurs and five mountain guns. The return from Kérouané to Bissandougou was only marked by an encounter with a band of Sofas at the marigot of Bananko. One company was left in garrison at Bissandougou with three mountain guns, and, by the 19th April, the column had got back to Siguiri. The results of the 1892 campaign were not brilliant. In fact, the expedition had only succeeded in carrying the base of military operations 50 miles further to the south.

As soon as Colonel Humbert had brought his column back towards Senegal, the little garrison at Kérouané found itself blockaded, its communications with Kankan intercepted, and the commandant of the post, Captain Wintemberger, was reduced to sending out constantly little expeditions in order to surprise the posts of the Sofas and to widen the circle of their investment. In one of these *coupes de main*, on the 1st April, 1892, Samory was very nearly made prisoner, being only enabled to escape thanks to the devotion of his Sofas.

The moral effect produced upon Samory and his forces had been considerable; the bullets of the Lebel rifle especially terrified them. Colonel Humbert had only some 30 of these weapons—few enough. Nevertheless in the hands of expert marksmen they produced wonderful results. Thus, when the Sofas advanced under cover on the left bank of the Milo, in order to open fire on the garrisons of Samankoro and of Kérouané, they believed themselves wholly sheltered from the reach and out of range of the French projectiles behind the huge timber trees, often hollow within. The bullets—of small calibre—were capable of piercing through these natural obstacles, and many Sofas were killed by bullets passing through the trunks of the trees—to their great amazement and terror. This campaign of 1891-92, therefore, had its due effect; it prepared the ground for the ensuing campaign, which owed its success and results in a great measure to the profound demoralization created by these preliminary operations, which now pervaded the ranks of Samory's army.

At the time when Colonel Humbert marched on Kérouané Samory possessed, or at least had a great influence over, two large fortified villages, Tiongi and Fourou, which are situated at 62 miles to the south-west of Sikasso, on the road which leads from the States of Tieba towards the regions then occupied by the French. When the French Resident at Sikasso, Lieutenant Marchand, asked Tieba to march against Samory he was unwilling until he had subdued these places—Tiongi and Fourou—which were in a position to threaten his communications.

Tieba at length sent, in August, 1891, a column against Tiongi.

This village resisted for a long time. Behind earthen walls of slight thickness the inhabitants held out for several months against their assailants. These, in order to reduce the town, constructed all round it numerous stockaded blockhouses of larger or smaller sizes, which they call *sagnes*, and which constituted a series of redoubts, insuring the complete investment of the place. These *sagnes* were attacked and defended for some weeks, for it is only with artillery that it is possible to reduce speedily the defenders of such fortifications.

The campaign against Tiongi, although it ended on the 7th September by the taking of the town, indisposed Tieba, and especially his followers, for further operations. In spite of all the efforts of Lieutenant Marchand, he declared that he would not proceed against Samory until after he had made himself master of Fourou. As it happened, Tieba was not obliged to send his troops against Fourou, for in May, 1892, this town opened its gates to Lieutenant Marchand, who went to Sikasso on his return from the exploration of the Kalandian and the Upper Cavally. Meantime Captain Peroz, a Soudanese diplomat, who had treated with Samory, was sent on a mission to Tieba by Colonel Humbert at the end of the year 1891, and he also failed to obtain material assistance against Samory. Tieba preferred to remain neutral.<sup>1</sup>

In 1892 the situation throughout the Soudan to the south and south-east was not promising. The populations of the north-east of the Soudan had become aroused, at the instigation of that old enemy to the French, Ahmadou, now taking refuge in Macina, where he was carrying on intrigues against his brother Mounirou. Besides, the *Fana* of Sansanding, Mademba, had not been very successful in his new kingdom, for around him a coalition had been formed by El Hadj Bougouni, chief of the province of Mampala, the friend of Ahmadou, whom he had helped to pass on to Macina after the abandonment of the Kaarta. El Hadj Bougouni had grouped around him some Toucouleurs commanded by Oumarel-Samba-Doulé, and some Bambaras from the Monimpé and the Sokolo districts. All these forces now marched against Sansanding, which was soon closely invested. Mademba called on his colleagues at Ségou, and Bodian sent all his disposable troops on the left bank of the Niger to assist in the defences of Sansanding.

At the same time some important uprisings took place in the south of the kingdom of Ségou. A violent cattle plague, originating in the Central Soudan, had in the course of the two previous years destroyed a very large proportion of the cattle in the valley of the Niger. The populations who most suffered were the Peuhls, and such was the misery of those in Ségou that they resolved to abandon the country and regain the regions of Segala and of the Bakhounou, situated on the left bank of the Niger, where formerly they had resided. This emigration likewise partook of an insurrectionary character with regard to the new rulers of Ségou, and at the moment when the French

<sup>1</sup> After the death of Tieba the power passed into the hands of his brother Bemba. But Tieba has left a son named Phou, who possesses considerable influence in the country, and he and Bemba are consequently rivals.

Resident was informed of these incidents he heard of the assassination of Lieutenant Huillard, killed in an ambuscade which the Sam-bori Peuhls had placed to entrap him. Captain Briquelot did not lose a moment. Ségou was denuded of troops, for Bodian had sent his contingents to aid in the defence of Sansanding. Nevertheless he found it possible with 100 men to bring in and bury the body of Lieutenant Huillard, and, moreover, to attack the Peuhl encampment at Bommouti and put to flight the contingents there assembled. But the numbers were disproportioned, and the small troop of Captain Briquelot lost five natives killed and 34 wounded, among whom were the only three European officers among them. It was therefore necessary to return to Ségou, whilst the Peuhls were overrunning the whole country. The French communications were soon cut off for some little time, and Ségou was blockaded as well as Sansanding.

Colonel Humbert, who happened at this time to be in the neighbourhood of Siguiri, returning to Kayes, at once sent Major Bonnier to take the direction of affairs in the north-east of the Soudan. Commandant Bonnier raised at Bammako an auxiliary company of tirailleurs, crossed the Niger on the 13th May, and joined his column to the force which Captain Briquelot had brought from Ségou, which now amounted to 1,000 of Bodian's men. On the 28th May he met the Peuhls, to the number of about 1,000, cantoned at Nonguella, put them to rout and pursued them. Catching them up again on the 3rd June at Ouo, on the Baguié, after a forced march of 40 miles in 24 hours, he killed 100 of their men and made numerous prisoners. The Guénie Kalari Province, which lies to the south-west of Ségou, was thus cleared of the marauding bands which troubled it.

This movement among the Peuhls, however, had been joined by the late rebellious insurgents of Baninko and of Minianka; so it was at Koila, at 45 miles to the east of Ségou, in the centre of the province of Kaminiandougou, that the centre of the revolt was established. Commandant Bonnier having gone back to Ségou after the affair in Guénie Kalari, set off again on the 19th June, in order to attack Koila. The rapidity of his march enabled him to surprise the rebels, who were forced to fly, leaving behind them over 100 dead bodies and 500 or 600 prisoners. Bonnier was next able to lead his column to the relief of Mademba, who was still blockaded in Sansanding, where he arrived on the 20th June. He was just in time, for El Hadj Bougouni had established his head-quarters in the village of Doséguéla, situated some 12 miles to the north of Sansanding, and his horsemen had ventured to approach within a few hundred yards of the town itself.

On the 25th June, Commandant Bonnier ordered an advance upon Doséguéla by the contingents of Bodian and Mademba, supported by some Senegal tirailleurs under European officers. On the 26th a fight took place under the walls of that place, and the Bougouni and Toucouleurs of Oumarel-Samba were put to flight; Oumarel-Samba was slain, and an attack was then made on the fortified village itself, which was held by Bambaras. A breach having been made by the artillery, Doséguéla was at last carried by storm. The chief of this

village, Niéné Taraoré, in company with 40 of his most faithful followers, blew themselves up with their magazines, and El Hadj Bougoum fled away to the north and reached his own dominion. The enemy lost over 300 slain, whilst the French on their side lost 16 natives killed and 120 wounded, including two European officers.

Thus, in less than two months, the double insurrections which threatened the French possessions of Ségou and Sansanding had been extinguished.

#### FIFTH PERIOD.

##### *Colonel Combes' Campaign, 1893.*

The general outlook of French affairs in the Soudan at the end of 1892 was somewhat critical, and, since Colonel Humbert had retired from the command, the direction of affairs in the Soudan was confided to Colonel Archinard by the Under-Secretary of State; and it was decided that the direction of the active operations should be given to Colonel Combes, who was appointed to the command of the Soudanese native regiment, now newly organized.

The task of Colonel Combes was more especially to isolate completely the territories which Samory governed, both from Sierra Leone, whence he procured breech-loading magazine rifles and ammunition, and from the Fouta Djallon, where he was able to exchange his prisoners as slaves in exchange for oxen and provisions. In order to carry out his programme it was necessary for Colonel Combes to occupy the valley of the Upper Niger, and to construct there one or more posts up the river from Kouroussa, hitherto the most advanced of the French posts in this direction.

In this high valley of the Niger, for some time past, one of Samory's best and most active lieutenants had been operating, by name "The Old Bilali"—a name given to distinguish him from his sons, also chiefs of the Sofas—who, in concert with Ténesso-Koba, another subordinate chief under the orders of the Almamy, guarded the provinces of Kouranko, Sankaran, and Kissi.

The expeditionary column, including a company of the Foreign Legion under Captain Destenave, was concentrated on the line from Kita to Siguiri, where it arrived on the 21st December, 1892. There the column was formed which Captain Briquelot was to lead into the valley of the High Niger; and between the 24th and 25th December the principal portion ascended the Niger in native canoes, which had been assembled for this purpose by M. Ballien, the commandant of the Siguiri district. The column arrived on the 30th December, 1892, at Kankan, having passed many villages, all ruined and abandoned, but without meeting any obstacles beyond several of the enemy's outposts on the crests of the neighbouring hills; and here the colonel decided to take the line of the Milo, from Kankan to Kérouané, as the base of his operations. After having reconnoitred the river and ascertained the depth of the channel, he perceived that it would serve him as a road for rapid communication from Bammako to Siguiri and Kérouané. All his information being of the most shadowy descrip-

tion, Colonel Combes determined to close with the Sofas as soon as possible; and on the 8th January, 1893, he reached Ouomi, an important strategical point on the left bank of the Milo. There two groups were formed: one, the column of the Milo, under the orders of Commandant de Gasquet, to guard the fords and to keep open the passage to the posts of Kérouané; the other, under the personal orders of Colonel Combes, for active operations in the field.

Colonel Combes left Ouomi on the 15th January, 1893, and arrived without incident at Konafadié, a large village situated south-west of Kankan, whence the Sofas, commanded by Samory, fled before the approach of the French troops. Some prisoners were able to give the dispositions of the enemy, whose object appeared to be to escape from the French advance by the south-east of Kérouané, from the Guéléba and from the Nafana, where the Almamy had placed in safety his wives, his corn, and all his goods.

Colonel Combes returned to the Milo, and by the 24th January established himself at Babila, 24 miles to the north of Kérouané, in a position which commanded the routes both from the east and south.

On the 25th January a flying column was formed which, under Captain Dargelos, could operate in the Kouranko and the Kissi valleys to the south-west of Kérouané, in order to intercept and drive back to the east any bands which ravaged that country. Orders were at the same time given to Captain Briquelot to drive back towards the valleys of the Milo and the Dion the bands of Bilali and of Ténesso-Koba.

A lightly equipped column was then formed to march upon Guéléba and the Nafana country, hitherto almost unexplored, and in relation to which only the most vague information was obtainable. This column included 103 mounted Europeans, men and officers; four companies of native tirailleurs, a squadron and a half of spahis cavalry, and 800 porters, carrying on their heads burdens of from 50 to 55 lbs. ( $\frac{1}{2}$  cwt.), equivalent to 30 days' provisions for the Europeans, and six days' supplies for the native African troops and bearers. Leaving the Babila ford on the 4th February, this column took its way rapidly to the east, where it surprised, at Guéléba, the principal bands of the Almamy—particularly that of the Chief N'Golo, who suffered considerable losses, and obtained possession of large stores of provisions. The bands of Samory always retreated fighting, and disputed the passes, fords, mariots, and rivers; burning, as they fled, all the villages on the way, with their stores of provisions, driving before them, like flocks of cattle, the unfortunate inhabitants, terrified by the cold-blooded cruelty of the Almamy. The French column, which marched early and late, often covered a distance of 24 or 27 miles, through a country full of natural obstacles, thereby overtaking the Sofas, who were thus surprised, time after time, whilst in the act of throwing up defences, palisades, entanglements of creepers, &c., at different points in the road, obstacles which, thanks to the rapidity of the French pursuit, were only just commenced, and never brought to completion.

In consequence of this system of harassing the retreat of the enemy, Colonel Combes was enabled to cause the enemy immense losses in men, horses, rice, honey, and kola nuts, provisions which largely assisted the food supply of the French natives, soldiers, and bearers, and also enabled the regulation rations of the white troops to be improved by abundant distributions of rice.

From Guéléba the column marched towards the south-east, towards the Nafana, a country thickly wooded with the strong vegetation of the Tropics; a country covered with jungle, impassable except where the narrow pathways under the trees seemed at times almost indistinguishable, and apparently inextricable. In addition, it may be noted that this difficult country is inhabited by a black race almost savage, and intersected by deep streams, full of water throughout the year, for it rains here for 10 months out of the 12.

This Nafana country was entirely traversed from north to south, and a region was arrived at wholly unknown to Europeans (where the inhabitants build their huts up in the trees, for the purpose, as we may suppose, of being out of reach of inundations), and the fighting throughout was incessant. The great danger for the French was their liability to be fired upon, anywhere and everywhere, from an enemy totally hidden in the luxuriant vegetation.

After having caused as much damage as possible to the enemy, the column retraced its steps. During this arduous march the French troops fought in 14 actions, on all of which occasions the enemy suffered severe losses. They marched nearly 560 miles, crossed 172 marigots with steep banks and full of water, 13 large rivers, and re-entered the post of Kérouané on the 33rd day, on the 10th March, 1893, without having lost a single European. They had 2 men of the Foreign Legion wounded, 4 tirailleurs and spahis killed, and 15 natives wounded. It was a remarkable exploit.

Meantime Captain Briquelot was operating in the upper valley of the Niger against the bands of the elder Bilali; but after his first day's march in the enemy's country, he was obliged to leave his guns in a post, on account of the delays which they occasioned in such a difficult country. Two encounters with the Sofas ensued at Douako and Yalinkoro, on the 14th and 24th January, when Bilali and his bands were driven southward towards the Kissi, whither the small column pursued them, again giving them a beating on the 3rd February at Bambaya. Bilali turned out of this place thoroughly disabled, and would then have taken refuge in the thick forest to the west of the Kissi, but he was prevented so doing by the inhabitants, who, rising at the approach of the French, attacked the demoralized sofas, and massacred them in large numbers in their villages wherever scattered groups of them had taken shelter. Bilali and his few remaining followers made their way back towards the north-west, where they were completely defeated, on the 5th February, in a fight at Nianforando, near Erimankono. The old Bilali escaped falling into the hands of Captain Briquelot, and took refuge in the territory of Sierra Leone; but all his baggage, supplies, and 4,000 prisoners fell into the hands of the French.

On the 10th February, Captain Briquelot's force arrived at Erimankono, where a post was established, and at the same time another post was constructed at Farannah, 24 miles to the east, on the banks of the Niger. It was then learnt that Bilali had left the Sierra Leone territory, where he had obtained assistance and was again in the field with the band of Bakary-Touré.

The French recommenced operations on the 1st March, when they attacked the enemy at Guérineba, where he sustained severe losses. The column next marched in a southerly direction towards Bambaya, where Bakary-Touré had taken refuge, which place was reached on the 18th March, directly after the enemy had struck their camp. But the Sofas drive before them such numbers of the inhabitants that it is easy to follow in their track. The trodden down vegetation in their passage forms, in fact, a broad road more than 20 yds. broad. By the 20th March the large village of Yalé-Kalédu was occupied by the French and a large accumulation of supplies and provisions of all kinds were found there.

The French then experienced some difficulty in passing the Ouassoukou, a marigot strongly entrenched, which the enemy defended for more than 30 minutes. This obstacle having been surmounted, the pursuit of the Sofas was continued with vigour, the march being impeded by the numerous troops of slaves and cattle which they took with them. At last, during one dark and rainy night, the French surprised the African camp, which the Sofas had once abandoned, with all their belongings, and where the French made 4,500 prisoners. After sharp fighting, the Sofa bands retreated in disorder towards Bouillé, pursued by the spahis and Lieutenant Pouydebat, who dispersed them; and these bands, like those of the Kissi, beaten everywhere, deserted the country in small detachments towards the north-west, by the Milo, where they once encountered fresh difficulties.

Meantime Captain Dargelos, commanding the column of the King, was then operating in the vicinity where Captain Briquelot was cutting up the bands of Bilali. This column, composed of a section of the Foreign Legion, 2 companies of native tirailleurs, 1 troop of spahis, and 300 transport coolies, was engaged in Kouranko and the Kissi country against the bands of the Ténesso-Koba, of the younger Bilali, and of Amara, one of the sons of Samory; and he left Babila on the 29th January. After making some arduous marches through a mountainous country this column arrived before Fidaoua, a large village fortified by means of stockades and sally ports. Here, again, the Lebel rifles contributed largely to the demoralization of the Sofas, who were killed by the small-bore elongated projectiles easily penetrating the wooden planks of the stockades. Finally, the village was carried at the point of the bayonet, and the enemy suffered largely. The son of the Almamy was shot through the body, and only owed his safety to two of his faithful slaves, who carried him into the bush. The resistance was soon overcome, and upwards of 11,000 prisoners were captured.

These figures appear incredible, but it may be explained that the

prived at the same time of their arms and cattle. These unfortunate wretches were conducted into the peaceful regions of the Soudan and set at liberty. At the present time they inhabit peaceful villages and engage in agriculture under French rule and protection.

On the 12th February, the section of the Foreign Legion was sent back to Kérouané, and the column kept on its way, scouring the neighbouring country and driving out the remnants of the Sofas.

The inhabitants everywhere came out to entreat the French to occupy their country and to rid them permanently of the presence of Samory's soldiers; and, by the 6th March, Captain Dargelos was able to re-enter Kérouané, having reduced the masses of the enemy into little bands and scattered parties, who at last joined the bulk of Samory's forces beyond the Milo.

Colonel Combes, having taken the precaution to guard by posts of observation established at Kénimbourg, Maréna, Mananfara, and Babila, the line of the Milo, these disunited detachments fell, one after the other, within the defensive zone of these posts, and suffered accordingly. Thus, on the 7th May, it was foreseen that one troop, formed of the *débris* of several bodies of Ténesso-Koba and Amara's men, intended to make its escape by night through a pass between the posts of Mananfara and Babila. In consequence, however, of the dispositions made by Lieutenant Delaverrerie the Sofas were surprised and again completely defeated; Ténesso-Koba and Amara, losing their state war-cloaks, 20 valued captives, all their papers, Korans, and their wives, &c. A few of them who managed to cut through, including the mother of Amara, joined Samory himself on the Dion, after having barely escaped capture by a detachment of spahis, under Lieutenant Hautecloque, who hotly pursued them. The old Bilali encountered a similar reception shortly afterwards.

So in less than three months the expeditionary column had cleared of all Sofas the whole country west of the Milo river. The remnants of the large masses of troops which Bilali and Ténesso-Koba had so long maintained on the Upper Niger were destroyed, and, by the construction of the posts of Farannah, of Erimankono, and Kissidougou, the French were in a position to prevent Samory from easily providing himself with arms and ammunition from Sierra Leone.

At the beginning of April, Colonel Combes ordered the return of the column to Senegal. But previously he visited the posts newly established, selected a locality for the Residency on the Kissi, and despatched Captain Briquelot, with Dr. Gallas and 100 tirailleurs, to completely explore a route wholly within French territory which should open up communication with the coast. Accordingly Captain Briquelot set out on the 8th April from Farannah, and reached Komakry without encountering any opposition.

It is to be remarked that this notable campaign, which only lasted three months, and achieved such important results, cost the life of one European alone, a soldier of the Foreign Legion, who was killed at the taking of Fidaoua.

Whilst these events were transpiring in the south, Colonel Archi-

nard, who arrived in the Soudan on the 23rd January, 1893, heard of the death of Mounirou, the Sultan of Macina, to whose throne Ahmadou immediately succeeded. He at once made a hasty tour of inspection and proceeded to Nioro, the capital of Kaarta, where a re-organization of the provincial administration was necessary. He found the country quiet, the fields being cultivated, and trade with the Moors of the Sahara in full operation.

This activity in commerce is dependable on the attitude of the Moorish tribes. Whenever these Moors pillage a caravan the commerce is interrupted. The Ouled Nacer tribes, for example, still remained untamable. Colonel Archinard took immediate action. He at once prohibited the exportation of millet from the Kaarta over the border in their direction, for the Ouled Nacer Moors are unable to cultivate grain, which forms the base of their food supply. At the end of three weeks their chief came to Nioro with 300 men and 500 camels, and consented, in token of submission, to pay the French an annual tribute of 10 horses.

Colonel Archinard left Nioro on the 17th February, taking with him two small guns which he had left there in 1891. He proceeded towards Gombou, where he arrived on the 27th February. There El Hadj Bougoumi, whom Commandant Bonnier had well beaten six months previously at Doséguéla, came in to make his submission. Next he went on to Ségou, which he reached on the 14th March. There he learnt that the feebleness of Bodian, on one hand, and the intrigues of Ahmadou, on the other, had resulted in new uprising of the Bendougou and the neighbouring provinces of the Baninko and Minianka, whither had retired the bands of the Peuhls which had been broken up by Commandant Bonnier during the previous month of June. Colonel Archinard did not hesitate to depose Bodian and to put at the head of the Ségou district a French officer, whilst a column was organized to operate in the disturbed districts. With two companies of Regulars, Senegal tirailleurs, and four companies of auxiliaries, Archinard marched to the south directly upon Baninko. At Garo he crossed the Mayel-Balevel, and on the 28th March, after preliminary skirmishes, he beat the rebels at Kentieri. The next day he pursued the fugitives and completely defeated them at Mpesoba. After this fresh defeat the revolted Bambaras understood that it would be better to submit, and they delivered up the Peuhl chief who the previous year had led the revolt of Guénié Kalari.

From Mpesoba the colonel pushed on north-east towards the town of San, whose chief, for a long time an ally of the French, had concluded with Commandant Monteil a treaty acknowledging the French protectorate. The Almamy of San came to meet the French column, and facilitated the provisioning of the troops. But this did not occur at Djenné when they arrived on the 11th April, after having recrossed the Mayel-Balevel as high up as Touara.

Djenné is a big town of 10,000 inhabitants on the borders of the Mayel-Balevel, which communicates with the Niger by a navigable marigot. It is a very important commercial centre under the suzerainty of Macina. Ahmadou, who had prepared for an invasion

of Ségou, was at Mopti, 30 miles to the north-east, with his contingents.

In spite of the king's proximity, the Toucouleur garrison of Djenné was not anxious to resist. But the traders of Djenné, deceived by the weak appearance of the column, thought themselves strong enough to overpower the French, and prepared a resistance which was all the more intense in its fanaticism because Djenné is a town celebrated for its Mussulman schools. On the 15th, Colonel Archinard had his guns placed in position and began to bombard the military portion of the town, which is situated to the west of the mercantile town. On the 12th, the breach being sufficiently practicable, the assault was delivered. Two French officers were killed, Captain Lespieau and Lieutenant Dugast; the native contingents lost about 30 men, and there were many wounded. But the enemy lost between 400 and 500 dead, and the principal merchants obtained the cessation of the slaughter. In order to conciliate the inhabitants of Djenné, Colonel Archinard had avoided bombarding the mercantile town, so that the next day material order could be re-established, and the merchants made haste to pay a heavy war indemnity.

The Toucouleur garrison had fled with their chief, Alpha Monça. The column started in pursuit the day after, and after passing for the second time the right bank of the Mayel-Balevel, on the 17th April, entered Mopti, which the troops of Ahmadou had just evacuated. The chiefs of Macina, foreseeing that Colonel Archinard would march upon Bandiagara, the capital, had concentrated their forces on the road from Mopti to that important centre. It was actually at Kori-Kori that the encounter took place. The French had only four tirailleurs wounded after a short struggle, in the midst of which Ahmadou took flight. The King of Macina at once abandoned his capital, taking all his family in the direction of the Haoussa States. But Colonel Archinard, having entered Bandiagara on the 29th April, detached a flying column to pursue the fugitives, caught them up at the defile of Dalla, at a considerably long distance to the east of Bandiagara, and finally captured the *smala* (harem) of Ahmadou, who continued his flight almost alone, and his prestige was so irreparably damaged that Ali-Bouri, one of his most devoted adherents, at once submitted himself to French authority.

Colonel Archinard thought that it would be suitable to place on the throne of Macina a member of the great Toucouleur family; he, therefore, gave the crown to Aguibou, a brother of Ahmadou, who, for the last four or five years, when he was governing the province of Dinguiray, had given fairly satisfactory proofs of his friendly attitude; and, on the 5th May, he quitted Bandiagara, leaving as resident with Aguibou, Captain Blachère.

On returning towards Ségou Colonel Archinard made his way to Sansanding, and there, as at Ségou, he had to proceed to a re-organization of the country, the *Fama Mademba* not having been able to impose his authority upon his subjects. The kingdom of Sansanding was materially reduced; and the territories of Segala, of Monempe, and of Mampala formed, with Sokolo, the new district of Sokoto.

From Sansanding Colonel Archinard passed to Ségou, where he stayed from the 19th to the 23rd May, then on to Bamako, where he arrived on the 29th May, and he was at Kayes by the middle of the following month.

The effect of the rapid intervention in Macina, and the deposition of Ahmadou, dissipated an invasion which was preparing on the side of Ségou. The installation of the French at Djenné, where a post was established under Captain Gauterou, *Commandant de Cercle*, and the presence at Mopti of the Niger flotilla, under orders of Lieutenant de Vaisseau Boiteux, gave the French a preponderant situation in the valley of the Niger.

As soon as Djenné was taken, the people of Timbuctou sent emissaries to Colonel Archinard, protesting their desire to be at peace with the French, showing that Timbuctou was ready to open her gates to the protectorate of France.

#### *Recent Operations, 1893-94.*

It has been shown how, in 1893, whilst Colonel Combes, the dreaded "Cumbo" of the Sofas, was pursuing Samory in the valley of the Milo, of the Sankaran, and of the Bani, those large southern affluents of the Niger, Captains Briquelot and Dargelos, at the head of flying columns, destroyed the bands of marauding Sofas which Kemoko-Bilali, Samory's principal lieutenant, had established on the Upper Niger.

The centre of Bilali's operations, the large village of Erimankone was occupied by Captain Briquelot, who established there a post and, in order to prevent any renewal of offensive movements, other military stations were likewise established in the basin of the Niger at Farannah, and at Mafendi-Cabaya, a village which lies in the triangle formed by the two superior branches of the Niger, viz., the Falico and the Tembi. This territory seems to be a dependency of that province of Kouranko which Samory had conquered some years ago, and which extends beyond the watershed of the Atlantic streams belonging to the British colony of Sierra Leone into the basin of the Upper Niger, which forms an integral portion of the French Soudan.

In order to keep a surveillance over the caravans going from the regions still occupied by Samory to the commercial centres of Sierra Leone, and likewise to prevent the import of arms and ammunition, it was resolved to establish an advanced post further to the south than that at Mafendi-Cabaya.

The operations so far effected in French territory had resulted in the complete dislocation of Samory's bands of Sofas. Some warriors passing the French lines had been able to rejoin the Almamy's contingents concentrated in the neighbourhood of Ténétou, at more than 300 miles to the north-east, where his son, Karamoko, assembled them in the Bouzie, near Mousardou. But a large number of Sofas were thrown back into the British territory of Sierra Leone, where they pursued their habitual depredations. In order to destroy these hordes, which had thus collected inside their colonial frontier, the

British Governor of Sierra Leone, Sir F. Fleming, decided to establish in close proximity to the English frontier a chain of posts parallel to the French line. Caglieri, Falaba, Dangowalé Sangbé, were also furnished with garrisons of black troops, native police, and West India regiments. The establishment of these last two stations only dates from the middle of last year. In addition he decided that an expeditionary column should be sent to the front, to drive out the colony of Sofas who had established themselves within the colony. This column, consisting of 400 men of the 1st Battalion West India Regiment and colonial police, in charge of Captain Lendy, was placed under the command of Colonel Ellis, and proceeded inland last November, via Bendu and the valley of the River Boum.

It is 10 years since the question of the frontier line between Sierra Leone and the French Soudan became a subject for *pourparlers* between the Governments of Great Britain and France. By an agreement in August, 1889 (the final ratification signed on the 12th March, 1890), the frontier was determined between the French Guinea Coast and the colony of Sierra Leone. Some time afterwards, on the 20th June, 1891, the French and English Commissioners precisely specified the frontier line between Sierra Leone and the French Soudan.

It appears that Lieutenant Gaston Maxime Maritz was stationed under Captain Bouvie, who was in charge of the post of Farannah, on the Upper Niger, within a few miles of the north-east corner of the Sierra Leone frontier. In September he left with a small force of Senegal tirailleurs and natives, and proceeded to patrol southwards, via Liah, Cabaya, Fodoya, Selia, to Socora, on the Falico river. Thence he followed up the valley of the Falico to Maricolaya and Sambadougou, in the Kouranko country, in search of the Sofas under Bakary-Tourré, who were devastating the Kono country across the British frontier. Maritz's march was continued to Morabaya, across the stream of the Babbe, and along the watershed between the source of the Babbe and the Falico. He next reached Birimba, Tantafarra, and Walbabba, at the source of the Babbe. When he got down south, as far as Foria and Tembi-Counda, at the head waters of the Niger, he was right in the angle of the frontier line, and here he halted on December 21st. Some stragglers from the bands of Sofas (which had been driven by the British out of Sedu on the 20th, from the east side of the Daro Peak, a conspicuous point of the Kong Mountains), in order to facilitate the escape of Bakary-Tourré, who had doubled back towards the Kouranko country, gave information to Maritz that the Sofas were encamped at Waima, west of Tembi-Counda, and north of Daro Mount, and a good opportunity for a surprise attack upon them was not to be lost, even if the Sofas were across the frontier, for now they were foes to the British as well as to the French. Maritz at once marched, and halted on the 22nd within a few miles of Warina, where the camp of the Sofas was indicated to him. After midnight he started again, and, with a full moon to assist his march, was able to deliver his attack on the camp at 4.30 A.M., on the morning of the 23rd. Ten of his men were

killed, and he himself (mortally wounded) only discovered before he died that he had been attacking the British West India Regiment and the Sierra Leone Frontier Police, under Colonel Ellis.

The late Colonel Ellis's official reports have been published in full,<sup>1</sup> by which it plainly appears how the whole affair was due to a wretched mistake; and the friendly relations with our neighbours, the French, are not likely to be disturbed by this lamentable occurrence on the frontier. Since this affair at Warina, another petty collision between French and the Colonial constabulary of Sierra Leone has been reported as taking place in Samoh, north of Free Town, but no importance need be attached to such a trivial affair. Some excitement, however, seems to have prevailed at Monrovia, in consequence of the French flag having been hoisted on the Cavalley river, at the eastern extremity of Liberia. There is no doubt that the French would turn this river to better account than the Liberians can possibly do, but the left bank only is in their territory.

*Occupation of Timbuctou.*

Let us now turn from the south-west to the extreme north-east of the Soudan Français.

It has been shown above how Kayes had been selected as the capital of the French Soudan, of which province M. Albert Grodet was appointed Civil Governor, with Lieutenant-Colonel Bonnier as senior commanding officer of the military forces in the district. On the 17th November, 1893, when the season favourable for operations set in, the annual expeditionary column under Colonel Bonnier left Kayes towards the south-east, where the Almamy of the Sofas was reported as then besieging Ténétou.

By the 26th Colonel Bonnier had concentrated his column at Bammako,<sup>2</sup> and he at once crossed the Niger and advanced to the relief of Ténétou, which place, after a siege of five months, had now fallen into Samory's hands. It was easy to track Samory by the multitudes of corpses which he left everywhere behind him. It was not, however, until the 5th and 6th December that the French troops came up with their enemy, and two engagements took place on these two successive days, at Faraba, near the left bank of the Baoulé, and further south at Koloni, where the Almamy nearly fell into the hands of his pursuers. His "griot" (*i.e.*, a confidential attendant, who some time ago had accompanied Samory's son, Karamoko, to Paris) was thrown from his horse and captured by the spahis.

After the fight the column returned to Ténétou (68 miles from

<sup>1</sup> See "Times," March 1, 1894.

<sup>2</sup> From Kayes, by rail, to Medine, 12 kilom.; from Medine, by rail, to Bafoulabé, 114 kilom., by left bank of Bakoy river. From across the Bakoy river to Diouleba, 43 kilom., by Decauville, narrow gauge line. From Diouleba, by water, to Badumbé, 38 kilom. From Badumbé, Lefèvre carts are despatched *via* Kita and Koandou to Bammako and Toulimando, 43 kilom. beyond Bammako, where the Niger becomes navigable.

Bammako), where a post was established, and thence marched back to Bammako by the 17th December.

Colonel Bonnier as senior commandant *pro tem.* (the Civil Governor not having yet arrived at his post) now organized his column for an advance on Timbuctou. Two divisions were formed, one (including all the staff, 2nd and 11th companies of tirailleurs, six mountain guns)<sup>1</sup> to descend the river in boats under the commanding officer, and the other, including the squadron of spahis (regulars), 10th and 12th companies, and irregulars, with two mountain guns and all the horses and mules, to march along the north bank of the Niger through the country of the Touareg Tenguerebbe, where some opposition might be expected.

The 1st division reached Ségou by the 20th, where all dispositions were completed, and Colonel Bonnier started on the 26th, with his troops in boats and lighters, down the stream, whilst Colonel Joffre, of the engineers, in charge of the mounted division, left on the following day, calculating to reach Timbuctou some eight days after the arrival there of Colonel Bonnier's troops.

Meantime Lieutenant Boiteux, commanding the small flotilla at Mopti, pushed on, without waiting for the arrival of Colonel Bonnier's column, to reconnoitre, and whilst the expedition was embarking at Ségou. Lieutenant Boiteux well knew that Timbuctou was only too ready to open its gates to the French, but it was rightly surmised that the Touaregs of the neighbourhood might assume an aggressive attitude. Lieutenant Boiteux landed with only 10 men, and after a skirmish on the 23rd (?) December, when the Touaregs were dispersed by a few shells from the "Mage" gunboat, he took easy possession of Kabara.

Two days afterwards Boiteux with Lieutenant Aube, at the head of their blue-jackets and "laptots" (Senegalais boatmen), entered Timbuctou without resistance, a few rounds of shell from the mountain guns sufficing to put to flight the groups of mounted Touaregs who watched the French movements from a distance.

After the tricolor had been hoisted at Timbuctou, Lieutenant Aube was sent with a small party of "laptots" to receive the submission of some of the neighbouring villages. On the 28th he and his whole party, M. Ledentec and 18 "laptots," were cut off by the Touaregs in the swampy plain of Kabara, and destroyed.

By the time Colonel Bonnier's column reached Mopti the commander learnt of this disaster at Kabara, and hastening on, capturing and utilising all the boats he could lay his hands on by the way, embarked there the 5th Company of Tirailleurs, reached Kabara, and entered Timbuctou without resistance on the 10th January, 1894. The artillery, 2nd Company of Tirailleurs, and convoy of supplies were still three days in rear.

On the 12th January Colonel Bonnier started off on a reconnaissance towards some Touareg camps at three days' march towards Goundam. He took with him all his staff, Commandant Hugny, the

<sup>1</sup> Mountain guns, De Bange 80 mm. (3·15 in.) throwing a 13-lb. projectile.

5th Company and a detachment of the 11th Tirailleurs. The Europeans were mounted upon donkeys, whilst Captain Philippe was left in charge at Timbuctou with the half of the 11th Company, to be reinforced on the 13th by the artillery and 2nd Company, &c. On the afternoon of the 14th January a Touareg camp was captured with a large herd of cattle, and the column then proceeded against another camp of the Touaregs some distance further on, leaving a section of the 11th and a section of the 5th Company under Sub-Lieutenant Sarda guarding the camp and cattle. Towards nightfall the column reached an encampment at Dougoi, which was found empty and apparently evacuated. Here, at 4 A.M., 15th January, the Touaregs, who had assembled at a short distance, surprised the column asleep and with an insufficient watch in the camp where they had taken up their quarters for the night, thoroughly knocked up with the fatigue of the march and their previous campaign. No out-post pickets or patrols appear to have been posted or organized. Closely followed by numbers of warriors on foot, the Touareg horsemen appear to have dashed in among the piled arms and cut down the few sentries before they could give the alarm. A party of horsemen at the same time made straight for the headquarters, which had been fixed in an open space, thereby giving an easy access. A number of cattle let loose by the Touaregs contributed yet further to the general confusion.

Captain Nigotte, in charge of the topography, sleeping at the headquarters, was able to escape with only a slight sword-cut, and join, together with several other fugitives, Sub-Lieutenant Sarda's detachment at the camp in rear, which retreated in good order and reached Timbuctou safely.

Captain Philippe at once sent out reconnoitring parties to bring in as many as possible of the tirailleurs who had managed to escape, and a few were thus recovered. Lieutenant-Colonel Bonnier, Commandant Hugny, Captain Tapard, Lieutenant Bouverot, Sergeants Etesse and Gabriel, Europeans, together with 1 sergeant, 6 corporals, and 61 rank and file tirailleurs (natives), were killed; 95 rifles and about 10,000 cartridges were lost. Captain Philippe at once placed his small garrison at Timbuctou in a state of defence, and as he was able to dispose of 300 rifles and six guns, he was able to disperse any of the surrounding bodies of Touaregs from approaching too near his lines, and to await the approach of Colonel Joffre's column.

Whilst these events had been transpiring, Colonel Joffre's column, composed of one company and a half tirailleurs, a squadron of spahis, 30 irregular spahis, 2 mountain guns (80 mm.) with all the horses and mules of the 1st division, had marched by land *via* Sansanding, Moninpé, Nampala Lère, and Soumpé, having crossed the Niger at starting from Ségou on the 27th December. The march was somewhat delayed by the difficulty of obtaining forage and corn for 250 horses and 1,000 natives in a country which was hostile, as well as by the inundated state of the Niger, which was exceptionally high between Lère and Timbuctou.

The column halted at Nampala, from the 7th to the 10th of January,

and arrived, on the 16th, at Soumpé, having taken a route across a deserted country to avoid the inundations. The Chief of Soumpé accompanied the French force onwards. Nioukon, the Chief of Niafounké, having threatened the French envoys, a company of tirailleurs, with the cavalry and guns, were sent, on the 20th January, against that village, which was found to be nearly surrounded by a marigot 2 kilos. across and 3 ft. in depth. 400 warriors were drawn up to contest the advance of the French, and at the first shots they charged to within a few yards of the French line. Upwards of 100 were killed by the French rifles; the rest fled, and the village was taken, without a casualty, by the column. Two other villages, Micore and Alta, were found evacuated at the approach of the French, and by the 26th, Captain Pouydébat, after a night-march, arrived at daybreak opposite Goundam, which is on the left bank of a broad marigot, but he was unable to possess himself of the boats which the Touaregs had removed across to the other bank of the stream, which was here 300 yds. broad with a rapid current.

Captain Prost with a squadron of spahis and half a company of tirailleurs, then in rear, proceeded to Tinghirma, on the Niger, where he arrived after ten hours' march by night and captured a quantity of corn and four boats. The villagers made some resistance and lost about thirty men. One tirailleur only was wounded on the French side. These boats were brought to Goundam the evening of the 31st, and their appearance caused much commotion among the Touaregs, who assembled at the point of disembarkation, but they were speedily dispersed by a few shells, and fled during the night. The last had disappeared by the morning of the 1st February, when the passage of the marigot was commenced. On the 2nd, the gunboat flotilla, which had been warned by French scouts, arrived at Goundam, and brought news to Colonel Joffre of the surprise of Colonel Bonnier's reconnaissance on the 13th January. The whole column had crossed the stream by the 3rd February. The Touaregs fled towards the north, and a reconnaissance sent in that direction failed to come up with them during a search of four days.

On the 7th February the column commenced its march to Timbuctou, and on the 9th reached the scene of Colonel Bonnier's surprise. The bodies of the officers and non-commissioned officers were found and carried to Timbuctou, where Colonel Joffre's force arrived on the 12th February.

During this march of 434 miles, the French lost only two native tirailleurs by sickness, and one native tirailleur was wounded.

Such, briefly, are the principal incidents connected with the occupation of the capital of the Western Sahara by the French.

Colonel Joffre's force, by the end of February, had finished the construction of a blockhouse at Kabara, commanding the landing-place, and the construction of an entrenched fort at Timbuctou was approaching completion by the end of March.

The principal chiefs of the sedentary tribes and the heads of villages in the neighbourhood soon came and gave in their submission, acknowledging the French Protectorate.

On the 3rd of March Captain Gautheran, with 40 tirailleurs and a machine-gun (Hotchkiss), marched against the Touareg camps at Takai-Gourou, dispersed the Touareg horsemen there, killing several, and captured 80 of their sheep and 50 asses. In another direction, on the 5th March, Captain Prost, at the head of 225 Soudanais auxiliaries, 80 spahis and 2 mountain-guns (80 mm.), surprised a large band of Touaregs near a marigot, killed a number of them, and seized a herd of 1,000 sheep, without a casualty to his own men.

The effect of these raids was soon indicated by the envoys of the Touareg Tenguereguif coming in to request an amnesty, which was granted, on condition that five of their notables would reside permanently at Timbuctou, and that the movements of the camps of these nomads were constantly reported, whilst a fine of 1,000 sheep was required to be delivered within 20 days. These conditions not being complied with, Colonel Joffre marched against the encampment of the Touareg Tenguereguif, between Lake Goro, near Diré, and Lake Fati. On learning the approach of the French, the Touaregs prepared to resist them in a position taken up near Lake Goro, where they were speedily dislodged on the 23rd March with great loss, their chief and his principal lieutenants being slain. On the 25th they were again attacked in their camp and driven into the country between Lake Fati and Goundam. Colonel Joffre's column captured on this occasion 59 horses, 30 camels, 8,000 sheep, 400 oxen, and 200 asses, whilst the bodies of 120 Touaregs were found on the field of action. Only one of the Tenguereguif chiefs escaped, having been badly wounded at Goundam, had remained at Farash with a few partisans. All the other chiefs were killed, and, in fact, the tribe has practically been extinguished. The news of this exploit has caused a sensation throughout the Sahara, and must inevitably spread the prestige of the French flag, which might have been endangered had the disaster of the 13th January been allowed to go by unavenged.

The sedentary populations of Timbuctou and the neighbourhood have soon begun to feel the good effects of the reassuring presence of the French troops. The word quickly passed that security reigned in the town, and caravans and lighters from Diaréfaré, Mopti, Bandiagara, and Djenné have commenced bringing corn, millets, nuts, and rice, so that the scarcity and distress which previously existed, owing to the exactions of the Touareg tribes, has already ceased. The position of the French garrison at Timbuctou is now assured, and its communication by steam, on water and railway, with Bafoulabé, is only a matter of time.

Colonel Joffre has carried off the honours of the campaign; the march of his small force along over 434 miles (700 kilos.) by land, leaving the banks of the Niger and proceeding north-east, by Léré, over difficult, broken ground, almost destitute of supplies, must be regarded as a very successful exploit. His bringing in all his men, horses, and animals, after six weeks on the line of march through a hostile country, with hardly a casualty, averaging 14 miles a day, is

excellent work, and exhibits the qualities of the few French officers who carried out this creditable operation, under Colonel Joffre's orders.

(It may be compared, in a small way, with Sir Frederick Roberts' march of 320 miles from Kabul to Kandahar, where the average was also about 14 miles *per diem*, but under a higher temperature; but, of course, the achievement of Roberts' force was a greater feat of endurance, for the marching was more continuous.)

It is by such achievements as those briefly sketched in the foregoing narrative that France has acquired that vast territory which has now received a political and administrative autonomy as "Le Soudan Français," comprising the whole country drained by the upper channels of the Niger and Senegal river systems. Its boundaries will serve to show its importance and extent. To the west it is now bounded by the French colony of Senegal and Portuguese Guinea; to the south-west by Fouta Djallon (a dependency of French Guinea) and Sierra Leone. Towards the south the frontier meets Liberia and the French Ivory Coast; whilst to the south-east are the British possessions of the Gold Coast. Towards the east, as also to the north, the delimitations of the French Soudan are not yet strictly defined, and must long remain uncertain; but the region now opened to French influence undoubtedly extends from Lake Tchad to Tripoli; whilst the whole of the Sahara, as far north as the limits of Morocco, from Cape Juby to Ghadames, cannot fail to acknowledge, sooner or later, the French Protectorate.

But a few years ago the French power did not reach beyond the basin of the Senegal, but by the prowess, perseverance, and gallantry of men like Archinard, Combes, Humbert, Bonnier, and Joffre, the tricolor has been carried far beyond, towards the interior, and, as we have seen, the whole of the Upper Niger now serves as a highway for European commerce, and a French garrison is firmly established at Timbuctou, the trade centre of the Sahara nomads, who are especially susceptible of military prestige. From Bakel, on the Senegal, to Timbuctou, the distance is some 600 miles and more. From Nioro, on the edge of the desert, to the Sierra Leone frontier, it is not less than 430 miles. The acquisition of this immense domain has been arduous, but the results are satisfactory, and will be profitable to the French nation. France may well be congratulated on the behaviour of her colonial forces. The Senegalais Tirailleurs, and Spahis, led by French officers, have uniformly distinguished themselves by their steadiness, tenacity, and endurance, both on the line of march and when encountering hordes of a fanatical enemy, which have nearly always far outnumbered them during the innumerable encounters by which they have deservedly gained possession of this wide and rich country. It is in order that the gallant deeds of our French comrades in arms during their recent campaigns with Mahomedan fanatics in the Soudan may become better known to officers of the British army abroad, who may not have the opportunity of reading the French accounts of these military events, that this slight description of them has been drawn up, in a very con-

denised form, from more voluminous reports<sup>1</sup> by the present compiler.

The CHAIEMAN: I will just make a remark or two before inviting discussion. We must all rejoice in having had laid before us a statement of the operations which have been undertaken by France during the last fifteen years; a statement of facts which, though I dare say known to experts, are very little known to the British public at large. I think also everybody must have rejoiced in what we have heard of the skill and gallantry and enterprise of our French comrades, and particularly in the introduction of peace and good order in that most distressful country, I say, advisedly "distressful country," because you have all recently read in the papers, in connection with Colonel Ellis's expedition, of the horrors committed by those atrocious bands of Sofas who ravaged the country. At first, when this lecture was proposed, alarm seemed to be felt by some lest we should enter on a thorny path and contentious matter that might give trouble. I do not think this is at all to be feared. The tone of the lecture speaks for itself, particularly in connection with what I told you of its origin. This institution, you will quite understand, has no other object than to propagate information as regards facts which are of interest to us all. I am delighted to see present my friend the French Military Attaché, and the French Naval Attaché, his colleague, who, if they will throw some light upon the operations described will be conferring a great pleasure upon us. Before inviting you to offer any remarks upon the lecture, I would merely call attention to one point of the description of the populations that are dealt with, viz., the "Toucouleurs." I wish the lecturer had been here himself to give us an explanation as to where he got the singular derivation of "two colours" from, but possibly some one may be able to throw light upon it. You will recollect the lecturer says the name "Toucouleurs" had some reference to the English occupation of St. Louis and Senegal many years back, but I doubt whether that is more than a popular superstition. If any one will aid us by throwing light upon these matters we shall be glad.

Major LE COMTE DUPONTAVICE DE HOUSSAY: I am not able to give any further explanation than that to which we have listened with such great interest. I have been very much gratified in listening to this lecture and also very much instructed. I have been gratified because I feel in all the words that have been said a spirit of good friendship for your comrades in France. I beg on this occasion to say that this friendship is quite the same on the other side.

The CHAIRMAN: Ladies and Gentlemen,—I am greatly indebted to Count de Heussey for his remark. I can only say further that if in thinking of these operations a feeling of envy may have arisen in any of our minds we need not to make great research into metaphysics to distinguish the character of that envy. There may be envies of different kinds, and if any was felt it would have been of a noble kind—leading to honourable emulation and a desire, in our sphere, to follow the example of the French in bringing civilisation to these regions. I will endeavour to make my own contribution to the discussion by speaking of the interest excited in seeing once again, as compared to our own method, the French method in starting and organizing a colony. It calls to mind the old history of North America. I would invite you to think of what the names are that you find now on the map over that vast region. The names of Lake Superior, of the great towns Detroit, Duluth, Qu'Appelle, and many others too numerous to mention, are just relics of the old French exploration under Government supervision and leading. Our method is rather to follow the trade; I think both have something to learn from each other in this matter. Conspicuous in the French management is the study which they devote and the qualities they show in understanding the

<sup>1</sup> *Vide Supplément du "Temps," du 28 Septembre, 1893; "Revue Française de l'Étranger et des Colonies et Exploration;" "Gazette Géographique," 1893-94. The sketch map of the Soudan has been reproduced, with permission, from that given in "Le Temps" of 28th September, 1893. The other maps from the French Military Service maps.*

people with whom they have to deal. I have here a very interesting French book from the library, the "Senegal and Niger," giving an account of the operations from 1879 to 1883, published in 1884. It contains one or two photographs, notably one of the railway bridge at Bafoulabé, about 300 miles from the coast, which will give the practical Englishman something tangible to note as to the material progress which has been made. A quality that I think we often lack rather is the power of taking pains to understand our neighbours, and this applies equally, I think, to understanding the operations of our civilised neighbours, and to understanding the natives and other people who are subordinated to us. Such a lecture as has been given to-day is valuable to correct any ignorance of what our neighbours, the French, have been doing in these countries. I am sure there are many Englishmen you pass in the street, otherwise very well informed, who would say, "Oh dear me, I should like to know what business they have got there," little knowing the laborious efforts, the result of, you may say, centuries of work which have culminated within the last few years, giving them their title. Somehow we certainly, as a nation, have learnt very little, until lately, about the natives beyond our own borders, in West Africa. West Africa has been a sort of *terra incognita* to us, and even now most of us think that while the people on the coast are negroes, uncultivated people and savages are to be found all the way into the interior. We have little other idea than that of the "Great Dark Continent." In speaking of Africa, the "Great Dark Continent" was thought to be an admirable expression, covering the whole field; whereas, as I think those who have listened to this lecture will understand, it is quite a partial description. In the regions of the Upper Niger, the natives, many of them, are people—those at least of the upper classes—who use the Arabic language and written character, and are certainly not to be considered as savages at all. As to the material advantages that we have to hope for from the restoration of peace and good order in these countries, we know that in the portions of the coast line which we possess, commerce is carried on and goods are imported and go into the interior away out of our ken. It, therefore, certainly is useful for us that we should know something about the populations to whom they go, what their demands and requirements are, and it must be important to us that they should be at peace and multiply, and become better customers. The subject is made rather difficult to us by what I may call the curse of Babel, which comes down to us in the different names by which the same peoples are represented. There was a name which struck me with great wonderment when I come across it in this narrative—I mean the "Peuhls." I thought it a very queer word. I made enquiries and found that the "Peuhls" are what are known as "Fulahs." Again, I find in that excellent book, Brockman's "Conversazion's Lexicon," that the Germans class them under the name of "Fellatah," and the other collateral names under which these people are known are given, and you may, therefore, understand that Peuhls, Fulahs, and Fellatahs are all the same. It is to be hoped that we may by free intercourse some day arrive at a common method of recognising these and other peoples. These Peuhls, coming originally from the east apparently, established themselves about the head waters of the Senegal and Niger, and after that, about two centuries or less ago, migrated again eastward across the Niger, and there connected with the Houssas, a name familiar to us as many of the fighting troops for our operations in Ashanti and elsewhere are Houssas. The Houssas States, between the forks of the Niger, i.e., between the Niger and the Benue, were largely formed by people allied to the Peuhls, or Fulahs. As regards *Toucouleurs*, that word, according to the "Géographie Universelle" of Réclus, which I should think would be the best authority, is derived from the name of the country where they live, that high country to the south-west of the Senegal, the Futa Jalon, once called Tacurol. The Portuguese, who were the earliest settlers, found this name and took up the name of the inhabitants as Tacurores, and I think from Tacurores to *Toucouleur* is a very easy stage. Again, in that book to which I referred just now, "*Toucouleur*" is given as a corruption from Tacurol and Tacurores.

Captain LE CLERC: I have been in Senegal for two years, and I know the "*Toucouleurs*" had nothing to do with the British. There is Portuguese blood mixed with the population, but there is no English blood there. The Portuguese

were there in very early times, as they were also in the Canary Islands. No doubt the Normans have mixed up to a great extent with the Negro population of the border, but that is not the reason why we call them the Toucouleurs.

The CHAIRMAN: There is nothing better known to philologists than to give a name a fancy derivative, based on a real resemblance in sound. I think we must be very grateful to Captain Oliver for the lecture which he has prepared, and for the clear way in which he divides his subject into periods: the first period, the advance to the Niger up the Senegal; the second period, the exploration down the Niger; the third period, the consolidation on the Niger up to Ségou; the fourth, the first expedition south against Samory; and the fifth, the second expedition, up to a few months ago. Inquirers who wish to get up this subject will find in the Library Stanford's "Compendium of Travel," 1878; the more recent edition is of 1884; a still more recent book is "Historical Geography of the British Colonies," No. 3, "West Africa," 1894, but in it, so far as I was able to examine it, I do not find any *résumé* of the French conquests of the most recent years, and the word "Sofa" does not appear in any of the books that I consulted. Events in Africa succeed one another very rapidly, and I really think publishers who look after these matters should be prepared to give us the latest information at frequent intervals. In thanking Captain Oliver for his lecture we must also thank Captain Maude for his labour in bringing it before us.

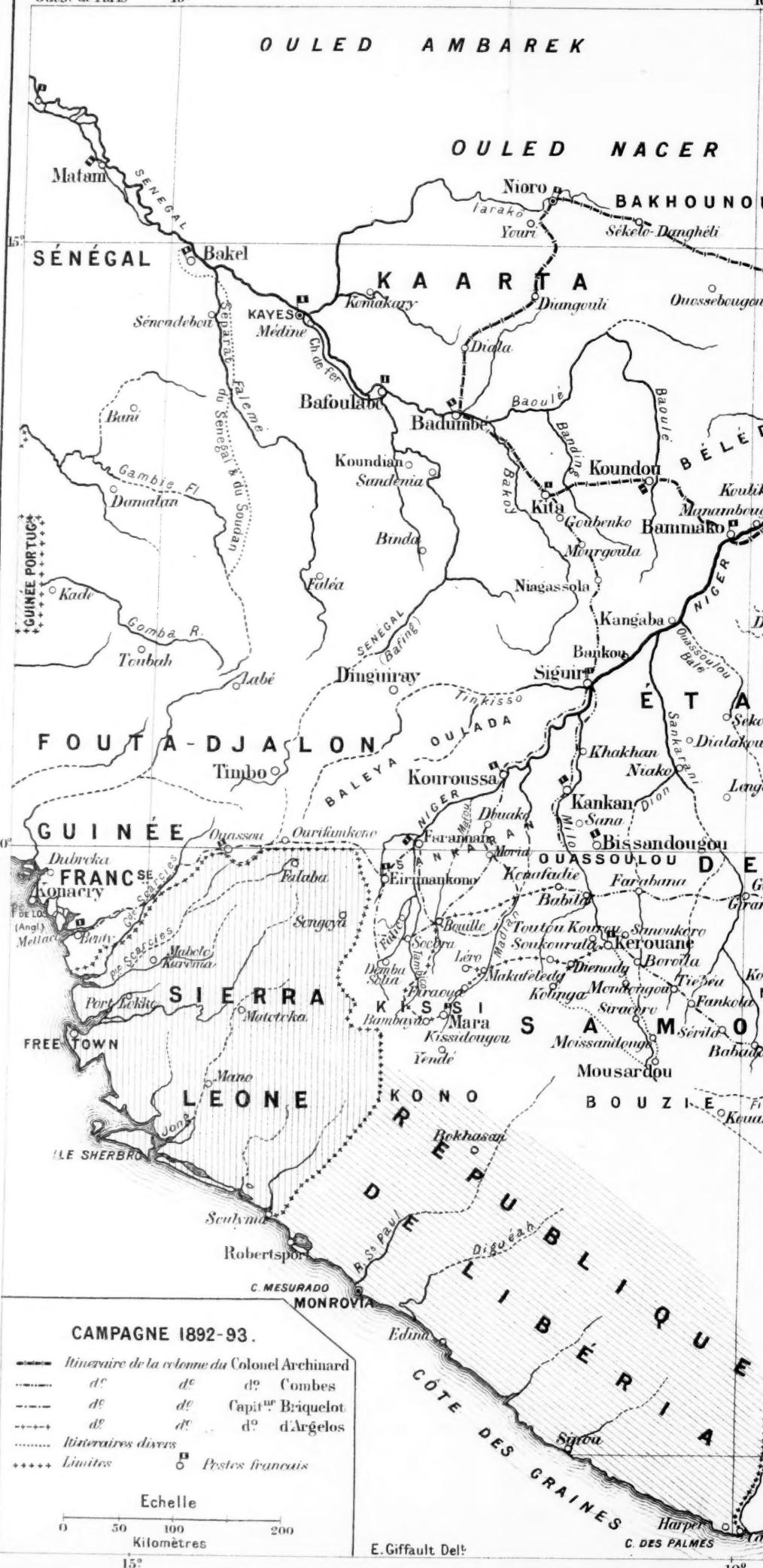
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# CARTE DU SOU

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# UDAN FRANÇAIS.

Plate 43.

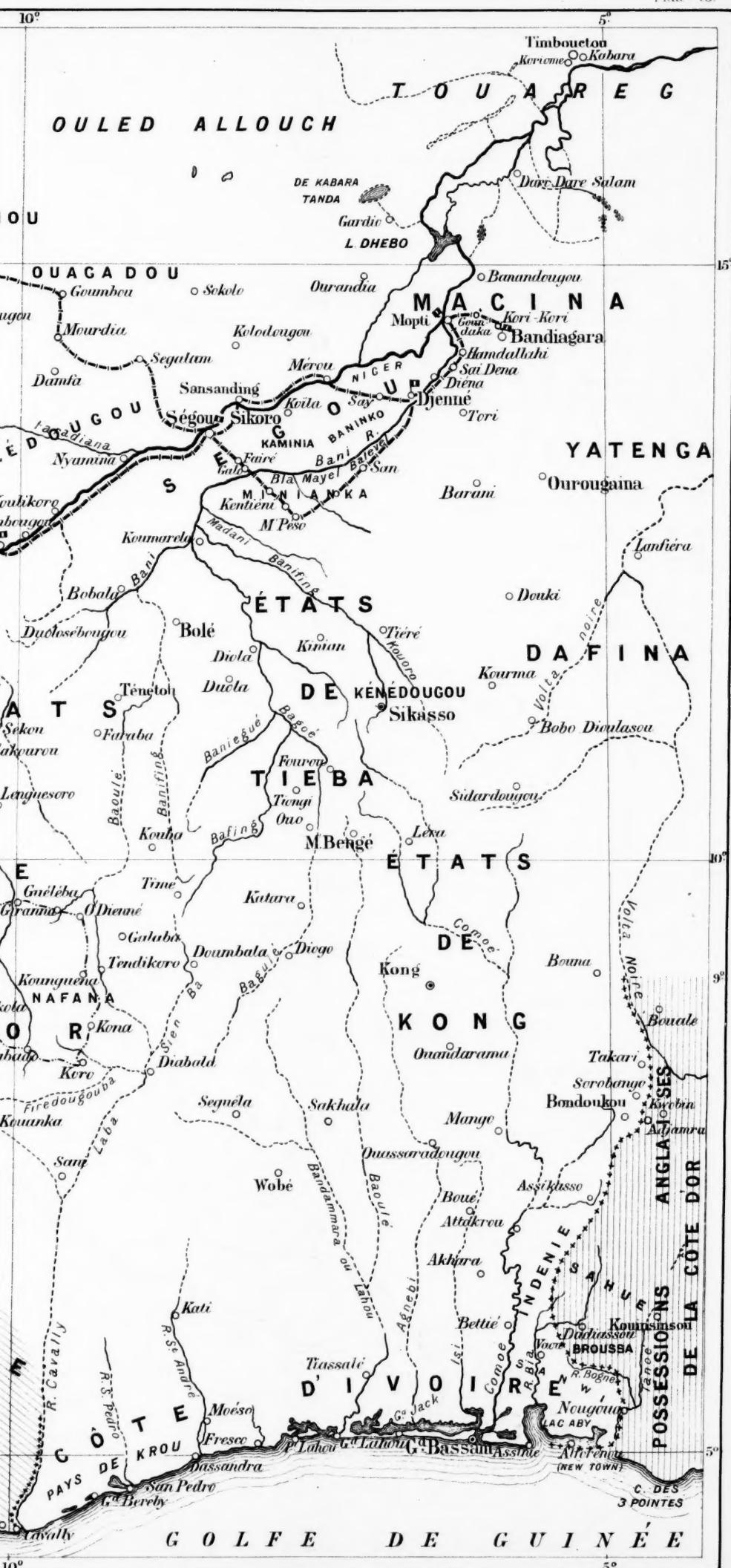
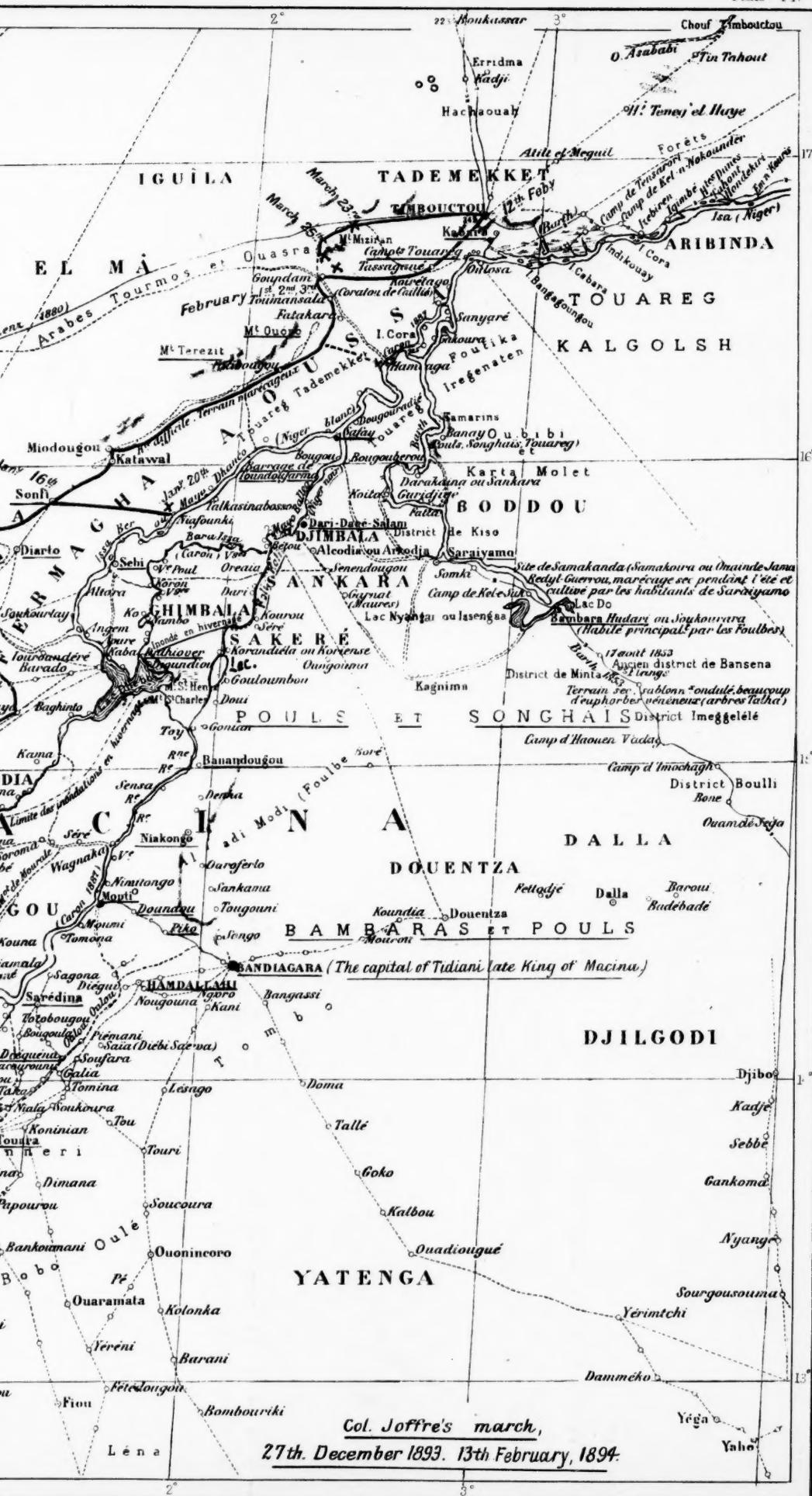
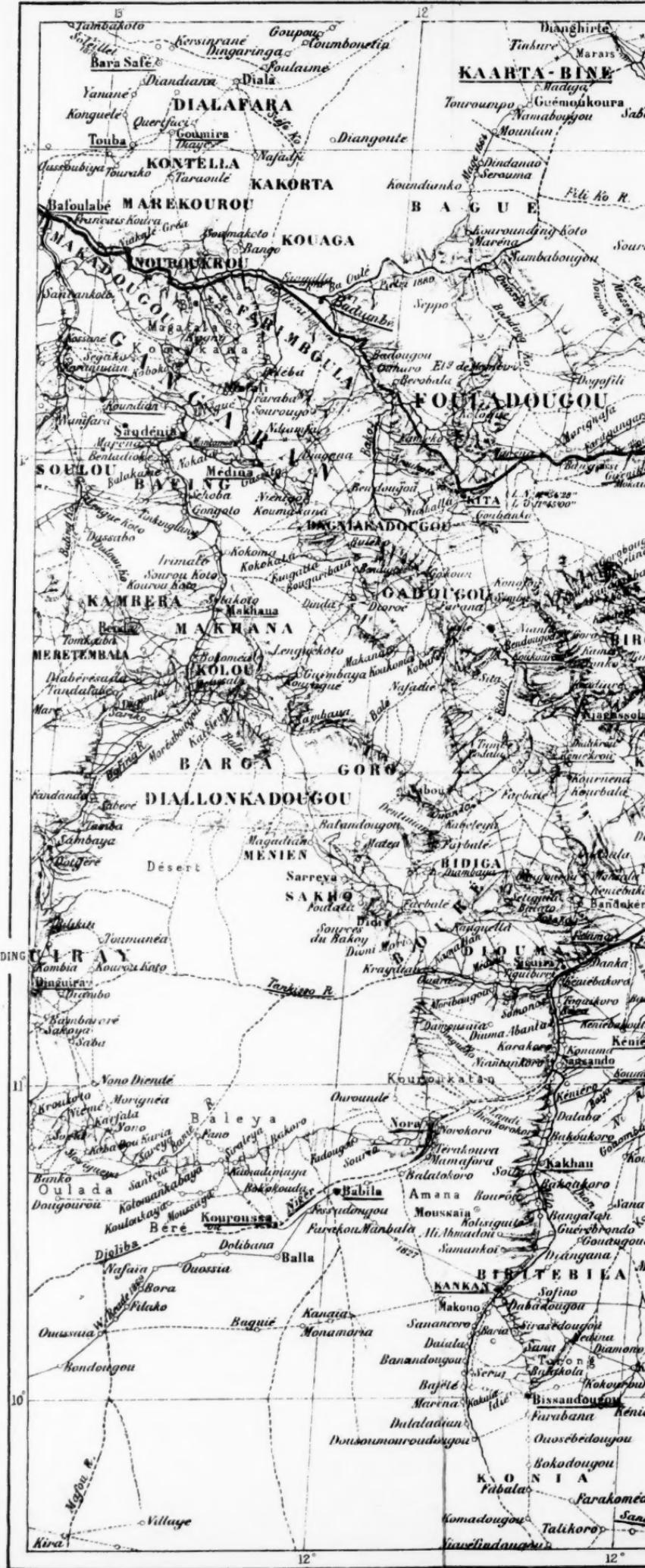




Plate 44







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## OCCASIONAL PAPERS.

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### SCHOOL SWORDPLAY.

By CAPTAIN A. HUTTON.

HARDLY a year ago Lord Methuen, an officer whose opinions on swordsmanship have to be respected, spoke with decision about this. "I believe," said he, "that if you are to introduce any system of fencing into our army it will be extremely difficult to find the material on which to work unless you induce the boys at public schools to learn." This was said in support of certain remarks of mine made at the Royal United Service Institution last year; and further said "It will not be a plant that you will find grow naturally in England, you will have to nurse it."

In the old times down to the early part of this century there is no more popular sport in England than what was known as "judgel" play, which may be regarded as the amateur form of "rakssword," the sturdy sharp-edged weapon of the 18th century rapiere, but since then its popularity has certainly sadly diminished; the cause of this, however, is scarcely a matter for present discussion. If it is to be revived to any extent in this country it must certainly receive that nursing which Lord Methuen prescribes for it, and it is in the public schools and in those which allow their lead that this nursing should be applied. But how? I am of opinion that all boys in army classes should be made to learn, but it should form part of their education, but I am inclined now to modify my views for two reasons—Firstly, because I am afraid that swordsmanship were to be included among the subjects of examination, a vicious system of fence would be forced upon us, and in the service we have already had enough of that kind of thing; secondly, because recent experience has shown me that it is quite as easy to attract boys to this fencing room as it is to order them there.

This experience of mine is based primarily on my connection with London Rifle Brigade, which has attached to it a cadet corps, and the lads, who vary in age from about 14 to 18, are entitled to attend the regimental school of arms; of course they all commence work on the foil, but it takes much application and many lessons to become even moderately proficient with that weapon, so by way of making the studies palatable we gradually introduce various feats of horne fence; many people on first seeing a bout of "rapier and dagger" or "case of rapiers" fancy it to be very difficult, whereas, the contrary, it is extremely easy, as may be understood, when we

consider that these arms belong to a period when fencing was in its infancy, and its movements, owing to the weight of the weapons, were of the simplest kind. When then the pupil has advanced a certain extent in his foil play, we interest him by teaching him, especially if he is a little fellow, the lightest form of historic fence, that of the dagger combined with the cloak, the manipulation of which although it looks complicated is really not particularly so, and this, if he is intelligent and active, he will learn in two or three lessons, and he can then have the amusement of loose play with these arms, while he continues his studies of the modern art all the more keenly; when we judge it expedient we introduce him to single stick, which presents no difficulties to him, because in our system his foil play leads him directly into it, and as he grows bigger and stronger we put into his hand the long Spanish rapier and dagger, upon which he has for some time been casting longing eyes, for he has seen them wielded in exhibitions of swordsmanship by the cracks of the school, and he begins to dream of like honours for himself, nor will he be long in attaining to them if he works well; from this to the rest of the 16th century combats the steps are easy, but he is never allowed to lose sight of the fact that foil play, as taught by the great French masters, is the foundation of the art, and he becomes so imbued with the idea that he never misses a lesson if he can help it; in course of time he becomes a very useful member, because we make it a practice, when he has arrived at a certain degree of proficiency, to allow him to take in hand some beginner, and by this means he acquires a skill in imparting instruction which will enable him at some future time to form a centre of swordsmanship in any place in which he may happen to find himself. In the L.R.B. school the effect of cultivating the ancient forms of fence as well as the modern has been that the youngsters have attained to such an eminence in the use of these various weapons, that a team of them were specially invited by the "Cercle d'Escrime" of Brussels to take the most prominent parts in the splendid *Fête d'Armes* at the Monnaie Theatre last May, a pretty considerable honour for young lads of 19.

It may be suggested that these cadets of our crack Volunteer regiments must as such have a special natural turn for arms, and that the same success would not accrue among a differently constituted body of boys. Fortunately we have had an opportunity of testing this. About a year ago I became acquainted with one of the masters of Bradfield College, to whom I explained my views; he told me that they were exactly the kind of thing that would delight his Head, and when the school reassembled I paid him a visit of a couple of nights—a Saturday and Sunday—and spent a matter of two hours with him in the school gymnasium; I found fencing taught to a small number of boys in a desultory fashion by an instructor of the usual army type, but who, luckily, was willing to learn, and I showed him and them a few important things which they could work on afterwards, and they did work on them. Before I left I arranged, in response to a request of the head master, to bring down a party of L.R.B. boys to show those at Bradfield what an attractive game

swordsmanship can be made, and when this exhibition of fencing was over I pointed out that it only rested with themselves to learn to do everything that they had just seen, and that if it suited the views of their head master I would pay them a visit of a few days with next term and show them how to do it. This took effect at once, for the boys sent a deputation to me to beg that I would remain there one more day and show them something further, which of course I arranged to do; and shortly after my return to London I received a letter from one of the prefects reminding me of my offer regarding the next term; and on revisiting them last February I was much gratified to find that some of the masters had become as enthusiastic as the boys, and that two of them had set themselves to master the art of giving instruction.

When I and my party were staying at Brussels rehearsing for the *Fête d'Armes* I kept my Bradfield friends *au courant* of all that took place there, and sent them the *libretto* and the various newspapers, the accounts in which fired them all, from the head master downwards, with a desire to emulate the Belgians.

They have close to the college gates, in what was once a chalk pit, surrounded by dense foliage, a complete Greek theatre, designed after some of those still to be seen among the ruins of the ancient cities, and this picturesque spot was made the scene of operations; they consisted of an entertainment of acting and swordsmanship combined, which would have reflected credit upon much more experienced performers. There were three dramatic events, one of them from Homer, one from Shakespeare's "Hamlet," and one from "Romeo and Juliet;" and these scenes were selected in order to introduce the fence of certain special ancient arms. The fight between Hector and Achilles, first with javelins and then with shield and sword, was very graphic, and the Greek dialogue remarkably well spoken, the death of Hector and the dragging away of his body behind the chariot of Achilles being extremely well managed. The fencing scene from "Hamlet" was played with the Spanish rapier and dagger, the weapons mentioned in the text of Shakespeare, but always ignored by professional actors, and was a very attractive encounter. The scene from "Romeo and Juliet" introduced three combats, that of dagger and cloak between two pairs of younger boys representing the quarrelsome servants of the Capulets and the Montagus, the duel between Mercutio and Tybalt with the "case of rapiers," and the fight of a mixed character between Romeo, armed with rapier and dagger, against Tybalt's "two swords;" there were three other non-dramatic events, namely, a French duel, produced with the necessary accompaniment of *témoins* and a doctor, a bout of 18th century "backsword" by two rather younger boys, which was about the best bit of fencing in the entertainment, and an encounter with "sword and buckler," very prettily played by two little boys of about 13; the swordsmanship throughout, as well as the acting, was peculiarly good, and reflected the greatest credit both upon the boys and upon the masters who have taken so much pains with them.

As may be supposed, an effort of so high a class as this required

considerable practice and rehearsal, but the whole was accomplished without trenching on school work and without in any way interfering with anybody's cricket. There are those I know who are inclined to object to swordsmanship at schools, for the reason that it may interfere with the customary outdoor games; experience at Bradfield, however, shows that such an objection is unfounded. King-Pearce, the captain of the football, and, I believe, a pretty strict captain, too, was the winner of the prize foils, and Thring, who was second and who fenced so well with him in the French duel, is one of the best shots in their rifle corps; Hewetson, who fenced in the "Hamlet" and "Romeo and Juliet" scenes, has cricket colours and is in the football XI; Kitchin, who played "case of rapiers" as Tybalt, is strong in both cricket and football, and has played in both elevens. H. A. Lomas (Achilles), the senior prefect, and Sadlier and Fearon, the two "backsword" boys, are well to the front out-of-doors, and in the Junior School, G. Porter and Shea are among the best, the former having been a captain of games; there are also many others who are prominent in both kinds of athletics.

Bradfield College has clearly shown that swordsmanship, when introduced in a judicious manner, possesses great attractions for young people, and that it can exist side by side with cricket and football without the slightest prejudice to either. I ought to add that its success at Bradfield is mainly due to the encouragement given to it by the head master, which has materially assisted the efforts of those other masters who have of late devoted much of their leisure time to helping and instructing the boys.

Bradfield College has set a grand example, which we may reasonably hope to see followed in due course by other schools.

A. HUTTON.

## RESEARCHES ON MODERN EXPLOSIVES.

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DURING the last two years we have carried out a long series of experiments with explosive compounds for the purpose of studying chemical reactions at high temperatures and pressures, and of elucidating certain thermal constants relating chiefly to the specific heat of gases under such conditions.

For these experiments we have principally used nitro-glycerin, nitro-cellulose, and several combinations of these two bodies which are used as smokeless gunpowders, for the reason that such modern explosives offer the advantage of not only presenting comparatively simple chemical reactions, owing to the absence of solid residue, but also of enabling considerable variations to be made in their composition so as to vary the proportions of the elements reacting.

We also expected that the results which we obtained would make a small contribution to the knowledge of explosives in general, following up the lines indicated by the published work of Noble and Abel, Berthelot, Sarrazin, Vieille, and others.

In this preliminary communication we propose chiefly to indicate the results obtained in the measurement of the heat evolved by explosion, and of the quantity and composition of the gases produced by this metamorphosis.

We have also made considerable progress towards the determination of the actual temperature of explosion, and we have succeeded in recording these high temperatures by photographic means, but, as this work is not yet completed, we shall not further refer to it in this paper, but we hope it will make the subject of another communication at an early date.

These modern explosives, and especially the smokeless powders, have assumed of late such importance that it may be of general interest to give here a brief sketch of their development.

About thirty years ago experiments were made in Austria with the object of using gun-cotton for the charges of rifle ammunition, but no success was obtained, and the matter dropped.

Other explosives, consisting principally of nitro-lignin or nitro-cellulose, not gelatinised, and mixed with nitrates or other substances, were afterwards invented and adopted for sporting guns successfully, and have been largely sold in the market under different well-known names. These explosives, however, were not found suitable for the charges of rifles and guns.

Further development in the science of artillery, and a better know-

ledge of the action of explosives, encouraged further researches for the production of new propelling agents for rifles and guns, and these researches have been so far successful that in a few years several new powders have been produced, each one of which is far superior to black gunpowder.

The new explosives now in use contain nitro-cellulose as one of their principal elements; some of them contain also nitro-glycerin in more or less proportion; the nitro-cellulose, by solution in nitro-glycerin, acetone, or other suitable solvent, is gelatinised, and by mechanical means the explosive compound is compressed and squirted into cords, or rolled into sheets, and then cut into strips or grains of suitable size for the different firearms.

The great secret of all these modern explosives seems to be that by the above means they are made into a solid substance, thus avoiding any porosity, and it appears probable that by doing so even the most powerful explosive can be mastered, so that, burning regularly from the surface, the rate of combustion can be controlled so as to avoid detonation.

This constitutes the most striking feature of the modern smokeless gunpowders, especially of those containing nitro-glycerin. If certain sized cubes, strips or cords of such powders are fired in a certain gun, and the length of this gun does not allow of sufficient time during the travel of the shot, for the explosive to be entirely consumed, the unburnt residue of the charge will be found to be of the same shape, whether cubes, strips or cords, only reduced in size; thus proving the most perfect surface combustion of these explosives.

It is thus possible to determine accurately what quantity of explosive, and what surface of combustion for the same, will be required, in order to obtain certain results in a certain gun, thus avoiding waste of powder.

This property of modern smokeless powder was illustrated on the occasion of a disastrous fire which occurred in May, 1890, at the factory of Avigliana, Italy, where large quantities of the explosive called ballistite were manufactured for the Government. In one building twelve tons of this explosive were collected, and various operations of manufacture were performed. By accident some of it took fire, and the whole quantity was burnt in a few seconds. Though this powder was made of such powerful explosives as nitro-glycerin and nitro-cellulose, and though the amount was so large that, had it been black powder, it would have caused destruction for many miles around, still there was no explosion of any kind; none of the machinery was in any way damaged, and the wood was barely charred.

The explosives used in these experiments can be divided into three classes:—

1. Those consisting of nitro-lignin or nitro-cellulose (not gelatinised), mixed, or impregnated with a suitable nitrate, and mixed with colouring matters and some other substances for the purpose of retarding the rate of combustion. We have taken as samples of this class the EC and the SS powders now commonly used in sporting

guns (the EC consisting principally of nitro-cellulose mixed with barium nitrate and a small proportion of camphor, the SS powder consisting of nitro-lignin mixed with barium nitrate and nitro-benzene).

2. Those consisting of purified nitro-lignin or nitro-cellulose gelatinised by a suitable process, and with or without the addition of nitro-benzene or other suitable nitrates.

As sample of this class we have taken the BN powder manufactured by the French Government, and also the Rifleite and the Troisdorf powder, which are now commonly used for small arms ammunition. (The BN consists mainly of gelatinised nitro-cellulose; the Troisdorf also consists of gelatinised nitro-cellulose, but is coated with graphite. Rifleite is also made with gelatinised nitro-cellulose, with the addition, however, of a certain proportion of nitro-benzene.)

3. Those consisting of nitro-cellulose combined with nitro-glycerin, with the addition of aniline, camphor, vaseline, or other kindred substances. To this class belong cordite and ballistite.

Cordite contains 58 per cent. of nitro-glycerin, 37 per cent. of gun-cotton, and 5 per cent. of vaseline.

Ballistite of Italian manufacture contains equal parts of nitro-cellulose and nitro-glycerin, with the addition of  $\frac{1}{2}$  per cent. of aniline.

Ballistite of German manufacture contains a slightly higher percentage of nitro-cellulose, and is coated with graphite.

Besides, for the purpose of these experiments, a series of samples of ballistite were specially made containing nitro-glycerin and nitro-cellulose in various proportions.

The experiments were carried out in two closed vessels of different dimensions and construction—a large one capable of standing high pressures, and a small one for calorimetric work.

The large one consists of a steel cylinder of great thickness, closed at both ends by conical screw-plugs. One plug is provided with a crusher-gauge of the well-known pattern by which the compression of a small cylinder of copper serves to measure the pressure developed. The other plug is provided with an insulated conical core, by means of which an electric current can be passed for the purpose of firing the charge. A small hole on the side of the cylinder, bushed with iridium-platinum, and closed by a coned screw-plug, serves to control the escape of the gases produced by the explosion.

The capacity of the chamber was carefully measured, and was found to be 247.6 c.c.

The small vessel is of the same pattern as used by Berthelot, and was made by Golaz, of Paris. It has given great satisfaction, and is in excellent order, although it has been used for more than two hundred explosions.

This bomb, which is made of mild steel and is cylindrical in shape, consists essentially of three parts—a bowl, a conical lid which is accurately ground into the bowl, and a tightening cap which screws on to the bowl over the lid.

There is a small hole in the lid provided with a delivery tube, which can be opened and closed by means of a finely-threaded conical plug. There is also an insulated platinum cone inserted from underneath in the lid, which admits of the charge in the bomb being fired by a platinum wire heated to redness by electricity.

From the lid depend platinum supports which carry a platinum capsule, in which the explosive is placed and suspended in the middle of the chamber.

The capacity of this bomb is 488 c.c., and the total weight, including a small stand, when ready for immersion in the calorimeter, is 5633.28 grams.

The calorimeter is made of thin sheet brass, and a helicoïdal stirrer of the same metal (Berthelot's pattern), driven by a small electromotor during the experiment, serves to thoroughly mix the water.

The calorimeter stood in the centre of an annular water-jacket covered with felt. The quantity of water used in the calorimeter each time was 2,500 grams, and the equivalent in water of the bomb, stirrer, and calorimeter, due allowance having been made for the different specific heats of the different metals, is 623.4 grams.

The different thermometers employed were specially made by Casella, capable of being read to 0.005 of a degree centigrade, and the weights of their stems, bulbs, and mercury were known.

Various experiments were made in the large vessel, especially for the purpose of determining the pressure of the gases under different densities of charge.

These trials were carried out in a field, the bomb being lowered into a hole in the ground before firing.

Various difficulties were encountered, and in one experiment considerable damage was done by the heated gases effecting their escape at the moment of explosion, and "washing away" part of the thread of one of the screw plugs.

With a density of loading of  $\Delta = 0.1$ , *i.e.*, with a charge of 2476 grams, the average of the pressures measured was 6.3 tons per square inch; with density  $\Delta = 0.2$  the pressure rose to 15 tons, and with  $\Delta = 0.3$  the pressure increased to 25 tons. These results are very similar to those published by Sir A. Noble, F.R.S.

With the small bomb were ascertained the amount of heat generated by the explosion, the volume and composition of the permanent gases resulting, and the quantity of aqueous vapour produced.

As most of the explosives contained no mineral matter beyond a trifling percentage of "ash," it has been possible to analyse them in this way, the products of explosion when calculated from the analysis and volume of permanent gas and aqueous vapour agreeing closely with the weight of matter in the bomb before firing.

A few of the explosives left a carbonaceous or mineral residue; but these will be specially noticed further on in connexion with the tables of the results.

The heat evolved was measured by placing the bomb containing the charge of explosive in the calorimeter containing 2,500 grams of

water, and it was arranged that the temperature of the air, the water jacket, and the calorimeter closely approximated each other. The stirrer was set in motion, and the thermometer in the calorimeter was read with a kathetometer. Observations of the temperatures were made every minute for the five minutes preceding the firing of the charge, and continued at intervals of a minute until the maximum was reached, and for five minutes longer. The correction for loss of heat due to radiation of heat during the experiments amounted in general to about 0°1 of a degree. The increase in temperature varied from about 1° to 2½° C. according to the charge and explosive used.

The gas generated by the explosion was passed through weighed drying tubes connected with the valve on the lid of the vessel, and then collected and measured in a calibrated glass cylinder over mercury. The reading of the barometer and thermometer was noted, and the volume reduced to 0° C. and 760 mm.

The water was determined by immersing the bomb in a vessel containing boiling water. A three-way glass stop-cock intervened between the valve of the bomb and the drying tubes, and the other end of the drying apparatus was connected with a water vacuum pump.

The other branch of the three-way tap was connected with a separate drying apparatus. When the water surrounding the bomb was boiling, by starting the vacuum pump the steam and water were drawn into the absorbing apparatus; after a good vacuum had been made in the bomb the three-way tap was turned so that dry air rushed in, then connexion was made with the drying apparatus, the bomb again exhausted, and so on, alternately, until (as experience showed) all the water had been removed from the bomb and collected in the drying tubes, which were then weighed. The weights of water thus obtained were calculated for comparison into volumes of  $H_2O$  gas at 0° C. and 760 mm.

The analyses of gas were carried out in duplicate in Dittmar's apparatus as improved by Lennox.

In most of the experiments the bomb, previous to firing, was exhausted, and the amount of residual pressure, varying from 24 to 0 mm., noted on closing it. The amount of air corresponding to these pressures left in the bomb has the effect of increasing the heat generated by a small quantity amounting to 5 to 7 calories. This quantity being within the limits of error of the calorimetric observation no correction was made for the same, but the quantity of residual air was taken into account when comparing the weights of the products found with the weight of the explosive used. Thus in Tables I and II the volumes of gas of the given composition and of aqueous vapour were obtained from the given weight of explosive increased by the weight of the air corresponding to the vacuum indicated.

When firing in an exhausted bomb it was found necessary to have the explosive surrounding the firing wire in comparatively small pieces in order to ensure ignition of the whole charge.

TABLE I.—*Indicating the Quantity of Heat, also the Volume and Analysis of the Gas developed per gram with different Sporting and Military Smokeless Powders now in use.*

| Name of explosive.                          | Calories per gram. | Permanent gases.   | Aqueous vapour.    | Total volume of gas calculated at 0° and 760 mm. | Per cent. composition of permanent gases. |      |                 |      | Coefficient of potential energy. |
|---|--------------------|--------------------|--------------------|--|---|------|-----------------|------|----------------------------------|
|   |                    |                    |                    |  | CO <sub>2</sub>                           | CO   | CH <sub>4</sub> | H.   |                                  |
| EC powder                                   | 800                | C.c. per gram. 420 | C.c. per gram. 154 | C.e. per gram. 574                               | 22.9                                      | 40.6 | 0.5             | 15.5 | 20.5                             |
| SS sporting powder                          | 799                | 584                | 150                | 734  | 18.2                                      | 45.4 | 0.7             | 20.0 | 15.7                             |
| Troisdorf, German                           | 943                | 700                | 195                | 895  | 18.7                                      | 47.9 | 0.8             | 17.4 | 15.2                             |
| Rifelite, English                           | 864                | 766                | 159                | 925  | 14.2                                      | 50.1 | 0.3             | 20.5 | 14.9                             |
| BN, French                                  | 833                | 738                | 168                | 906  | 13.2                                      | 53.1 | 0.7             | 19.4 | 13.6                             |
| Cordite, English manufacture                | 1253               | 647                | 235                | 882  | 24.9                                      | 40.3 | 0.7             | 14.8 | 19.3                             |
| Ballistite, German manufacture              | 1291               | 591                | 231                | 822  | 33.1                                      | 35.4 | 0.5             | 10.1 | 29.9                             |
| Ballistite, Italian and Spanish manufacture | 1317               | 581                | 245                | 826  | 35.9                                      | 32.6 | 0.3             | 9.0  | 22.2                             |
|   |                    |                    |                    |  |   |      |                 |      | 1083                             |

TABLE II.—*Indicating the Quantity of Heat; also the Volume and Analysis of the Gas developed per gram with Nitro-glycerin, Nitro-cellulose, and with several different Combinations of these two substances.*

TABLE II.—*Indicating the Quantity of Heat, also the Volume and Analysis of the Gas developed per gram with Nitro-glycerin, Nitro-cellulose, and with several different Combinations of these two Explosives made at Anlœuf Factory.*

| Composition of explosive.                               | Calories per gram. | Permanent gas. | Aqueous vapour. | Total volume of gas calculated at 0° and 760 mm. | Per cent. composition of permanent gases. |      |                 |      | Coefficient of potential energy. |
|---|--------------------|----------------|-----------------|--|---|------|-----------------|------|----------------------------------|
|   |                    |                |                 |  | CO <sub>2</sub>                           | CO.  | CH <sub>4</sub> | O.   |                                  |
| A. Nitro-glycerin .....                                 | 1652               |                |                 | 63.0   | —   | 4.0  | —               | 33.0 | 1224                             |
| B. Nitro-cellulose (nitrogen = 13.30 per cent.)         | 1061               |                |                 | 22.3   | 45.4                                      | 0.5  | —               | 14.9 | 929                              |
| C. { 50 per cent. nitro-cellulose (N = 12.24 per cent.) | 1349               |                |                 | 817  | 36.5                                      | 32.5 | 0.2             | —    | 1102                             |
| { 50 per cent. nitro-glycerin .....                     |                    | 249            |                 |  |   |      |                 |      |                                  |
| D. { 50 per cent. nitro-cellulose (N = 13.3 per cent.)  | 1410               |                |                 | 797  | 41.8                                      | 27.5 | 0.0             | —    | 1124                             |
| { 50 per cent. nitro-glycerin .....                     |                    | 247            |                 |  |   |      |                 |      |                                  |
| E. { 80 per cent. nitro-cellulose (N = 12.24 per cent.) | 1062               |                |                 | 901  | 21.7                                      | 45.4 | 0.1             | —    | 957                              |
| { 20 per cent. nitro-glycerin .....                     |                    | 226            |                 |  |   |      |                 |      |                                  |
| F. { 80 per cent. nitro-cellulose (N = 13.30 per cent.) | 1159               |                |                 | 864  | 26.6                                      | 40.8 | 0.1             | —    | 1001                             |
| { 20 per cent. nitro-glycerin .....                     |                    | 227            |                 |  |   |      |                 |      |                                  |
| G. { 35 per cent. nitro-cellulose (N = 13.30 per cent.) | 1280               |                |                 | 863  | 26.7                                      | 39.8 | 0.5             | —    | 1105                             |
| { 5 per cent. vaseline .....                            |                    | 236            |                 |  |   |      |                 |      |                                  |
| { 60 , , nitro-glycerin .....                           |                    | 627            |                 |  |   |      |                 |      |                                  |

Table I gives the principal results obtained with the several gunpowders above mentioned, Tables II and III give the results obtained with samples of ballistite made with different proportions of the component parts, Table IV indicates the effect of firing different weights of the same explosive in a closed vessel from which the air has *not* been exhausted, and Table V gives the original elementary composition of several explosives compared with the products of combustion, both being represented as weights.

With the exception of the results given in Table IV, all the others were obtained from the firing of 4 grams of the explosive.

In Tables I and II we have expressed the results of firing some powders now in use as well as certain specially prepared powders, so as to show the quantity of heat and the volumes and analyses of the gases produced, and have in the column headed "Coefficient of potential energy," given figures which serve as a measure of comparison of the power of the several explosives. These figures are the products of the number of calories by the volumes of gas, the last three figures being suppressed in order to simplify the results.

In the case of EC and SS a certain amount of mineral residue was left, but this was not determined.

Troisdorf leaves a slight, and Rifleite and BN a considerable, carbonaceous residue, part of it adhering so tenaciously to the bomb that an exact determination was not made.

In the other experiments recorded in Tables I and II the degree of accuracy of the results may be gauged by the fact that the average weight of the products of explosion, calculated from the results found, amounts to 99.7 per cent. of the weight of the explosive fired, the extreme limits being 100.5 and 98.9 per cent.

In Table II the comparison of the pairs of results from explosives made with lower and more highly nitrated nitro-cellulose shows that the use of the highly nitrated cellulose increases the quantity of heat developed, and diminishes the volume of gas. The composition of the permanent gases is also altered, as might be expected, there being an increase in carbonic acid and decrease in carbonic oxide and hydrogen.

The similarity in the volumes of gas produced and the composition of the permanent gases in the case of experiments F and G is worthy of note when the great difference in the original component ingredients of the explosives is borne in mind.

Table III shows clearly the increase of heat due to increased percentage of nitro-glycerin, as well as the difference of heat evolved from explosives containing nitro-cellulose of different degrees of nitration.

The diminution in quantity of heat (about 200 calories) which the replacement of 5 per cent. of nitro-cellulose by vaseline makes is also very striking.

Table IV shows the part played by the oxygen of the air in the bomb; when a smaller proportion of explosive in comparison with the air is present the combustion is more complete, and the heat evolved is greater, and the composition of the gases is correspondingly modified.

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4 " "  
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Traces of

TABLE III.—*Showing the Heat developed by Explosives containing Nitro-glycerin and Nitro-cellulose in different proportions.*

| Composition of explosives.            |                 | Calories per gram. |      |
|---------------------------------------|-----------------|--------------------|------|
| Nitro-cellulose (N = 13.3 per cent.)  | Nitro-glycerin. |                    |      |
| 100 per cent. (dry pulp)              | 0               | 1061               |      |
| 100 " " (gelatinised)                 | 0               | 922                |      |
| 90 " "                                | 10 per cent.    | 1044               |      |
| 80 " "                                | 20 " "          | 1159               |      |
| 70 " "                                | 30 " "          | 1267               |      |
| 60 " "                                | 40 " "          | 1347               |      |
| 50 " "                                | 50 " "          | 1410               |      |
| 40 " "                                | 60 " "          | 1467               |      |
| 0 " "                                 | 100 " "         | 1652               |      |
| Nitro-cellulose (N = 12.24 per cent.) |                 | Nitro-glycerin.    |      |
| 80 per cent.                          | 20 per cent.    |                    |      |
| 60 " "                                | 40 " "          |                    |      |
| 50 " "                                | 50 " "          |                    |      |
| 40 " "                                | 60 " "          |                    |      |
| Nitro-cellulose (N = 13.3 per cent.)  |                 | Vaseline.          |      |
| 55 per cent.                          | 5 per cent.     |                    |      |
| 35 " "                                | 5 " "           | 46 per cent.       |      |
|                                       |                 | 1134               |      |
|                                       |                 | 60 " "             | 1280 |

TABLE IV.—*Showing the Heat developed and the Analysis of the Permanent Gas produced in a closed Vessel from which the Air has not been exhausted—the Explosive being in every case Ballistite of Italian Manufacture.*

| Charge.      | Calories per gram. | Analysis of the permanent gas. |      |     |      |
|--------------|--------------------|--------------------------------|------|-----|------|
|              |                    | CO <sub>2</sub> .              | CO.  | H.  | N.   |
| 2 grams..... | 1587               | 37.0                           | 17.6 | 3.2 | 42.2 |
| 3 " .....    | 1485               | 36.4                           | 22.0 | 4.6 | 37.0 |
| 4 " .....    | 1446               | 36.2                           | 24.6 | 6.1 | 33.1 |
| 5 " .....    | 1415               | 36.2                           | 26.0 | 7.2 | 30.6 |
| 6 " .....    | 1380               | 36.3                           | 27.0 | 7.9 | 28.6 |

Traces of CH<sub>4</sub> were found, but in this series of experiments the quantity of this gas was not determined.

TABLE V.—*Showing the original Composition and Metamorphosis of Nitro-cellulose, Nitro-glycerin, and of several Gunpowders made by Combinations of these two Explosives.*

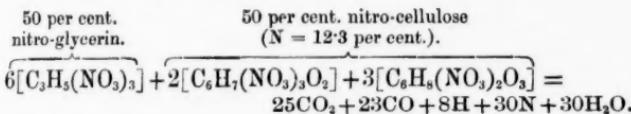
| Nature and description of explosive.                    | Per cent. composition by weight. |            |              |               | Per cent. products of combustion by weight. |                              |            |              |               |                         |
|---|----------------------------------|------------|--------------|---------------|---|------------------------------|------------|--------------|---------------|-------------------------|
|   | Carbon, C.                       | Oxygen, O. | Hydrogen, H. | Nitro-gen, N. | Carbonic acid, CO <sub>2</sub> .            | Marsh gas, CH <sub>4</sub> . | Oxygen, O. | Hydrogen, H. | Nitro-gen, N. | Water H <sub>2</sub> O. |
| A. Nitro-glycerin . . . . .                             | 15.7                             | 63.0       | 2.3          | 18.8          | 57.6  | —                            | 2.7        | —            | 18.8          | 20.7                    |
| B. Nitro-cellulose (nitrogen = 13.3)                    | 24.58                            | 57.48      | 2.73         | 13.6          | 29.27                                       | 38.52                        | 0.24       | 0.86         | 13.6          | 16.30                   |
| C. { 50 per cent. nitro-cellulose (N = 12.24 per cent.) | 21.15                            | 60.67      | 2.67         | 15.58         | 41.0  | 23.1                         | 0.08       | 0.4          | 15.58         | 20.01                   |
| { 50 per cent. nitro-glycerin                           |                                  |            |              |               |   |                              |            |              |               |                         |
| D. { 50 per cent. nitro-cellulose (N = 13.30 per cent.) | 20.47                            | 61.23      | 2.49         | 16.35         | 45.3  | 19.0                         | 0.00       | 0.3          | 16.35         | 19.90                   |
| { 50 per cent. nitro-glycerin                           |                                  |            |              |               |   |                              |            |              |               |                         |
| E. { 80 per cent. nitro-cellulose (N = 12.24 per cent.) | 24.37                            | 58.98      | 2.98         | 14.0          | 28.9  | 38.4                         | 0.05       | 1.0          | 14.0          | 18.2                    |
| { 20 per cent. nitro-glycerin                           |                                  |            |              |               |   |                              |            |              |               |                         |
| F. { 80 per cent. nitro-cellulose (N = 13.30 per cent.) | 23.11                            | 58.48      | 2.71         | 15.84         | 33.4  | 32.6                         | 0.04       | 0.7          | 15.84         | 18.2                    |
| { 20 per cent. nitro-glycerin                           |                                  |            |              |               |   |                              |            |              |               |                         |
| G. { 35 per cent. nitro-cellulose (N = 13.30 per cent.) | 22.2                             | 59.0       | 2.88         | 15.46         | 33.0  | 31.3                         | 0.2        | 0.7          | 15.46         | 19.0                    |
| { 5 per cent. vaseline . . . . .                        |                                  |            |              |               |   |                              |            |              |               |                         |
| H. Cordite, English manufacture                         | 22.91                            | 57.72      | 2.95         | 15.19         | 31.76                                       | 32.68                        | 0.32       | —            | 15.19         | 18.08                   |
| I. Ballistite, Italian and Spanish manufacture          | 21.47                            | 60.83      | 2.68         | 15.80         | 41.11                                       | 23.76                        | 0.12       | 0.47         | 15.8          | 19.69                   |

In Table V the elementary percentage composition of some of the explosives, along with the percentage composition of the products of explosion by weight, is given.

The composition of the samples has been calculated from the "bomb" analyses; as an example, one of the explosives and its decomposition may be represented approximately by the following equation.

We have assumed the nitro-cellulose to consist of a mixture of di- and tri-nitro-cellulose in proportion corresponding to the nitrogen as found by analysis.

The equation for Experiment C may be taken as follows :—



The composition of this explosive, calculated from the foregoing formula and found by analysis, is as follows :—

|        | Formula.    | Analysis.    |
|--------|-------------|--------------|
| C..... | 21.2        | 21.15        |
| O..... | 60.8        | 60.67        |
| H..... | 2.5         | 2.67         |
| N..... | 15.5        | 15.58        |
|        | <hr/> 100.0 | <hr/> 100.07 |

These are some of the principal features noticeable in a preliminary survey of these experiments. We are continuing our investigations on the lines indicated in the paper, and are especially endeavouring to measure the actual temperature of explosion under varying conditions, and it is hoped that the results obtained will throw some light on the chemical and physical properties of many gases at high temperatures and under considerable pressures, and, at the same time, be useful in the practical application of explosives.

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## NAVAL AND MILITARY NOTES.

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### NAVAL.

**Home.**—The following are the principal appointments which have been made:—Captains: L. Beaumont, as Director of Naval Intelligence, vice Rear-Admiral C. A. G. Bridge; E. Poe, to "Blenheim"; R. W. Craigie, to "Camperdown"; F. W. Fisher, to "Crescent"; W. M. Lang, to "Devastation"; and A. C. Corry, to "Achilles." Commanders: H. E. Cust, to "Dart"; H. C. Kingsford, for service with Victorian Naval Forces; H. M. Tudor, to "Bellona"; J. L. Marx, to "Barrosa"; E. A. Simons, to "Melita"; R. B. Farquhar, to "Hero," in command; and R. Cumming to "Caledonia."

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The "Achilles" is to be employed in conveying new crews for the "Nile" and "Fearless," which are to recommission at Malta. The following ships have paid off: 2nd class battle-ship "Dreadnought," from Mediterranean, and the 3rd class cruisers "Garnet" from the Pacific and "Pallas" from China; the "Assistance," which for the last 20 years has been employed on trooping service in home waters, has also been paid off and will be sold out of the Service. The 3rd class cruiser "Blanche" on the Cape Station, has developed such serious defects in one of her boilers, that she has been ordered home, and has been paid off, her officers and men being transferred to her sister-ship, the "Barrosa" which not long ago took the place of the "Bellona" in the Channel Squadron; the officers and men of the "Barrosa" are now again reverting to their old ship. The first-class torpedo-gunboat "Speedwell" is also to pay off, her officers and crew being transferred to the "Sharpshooter," lately fitted with the Belleville water-tube boilers, and which will take her place in the Channel Squadron.

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The new torpedo-boat destroyer "Decoy," built and engined by Messrs. John Thornycroft and Co., underwent her official trials off the Maplins, on the 21st ultimo. Six consecutive runs over the measured mile, with and against the tide, gave a mean speed of 27·641 knots. During the three consecutive hours of full-speed steaming, the mean speed attained was 27·7 knots, and the I.H.P. developed by the engines 3,900, giving three-quarters of a knot in speed, and 400 H.P. over the contract amount. The "Decoy" is a sister vessel to the "Daring."

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The first of the nine new 2nd class cruisers to be launched is the "Eclipse," and the ceremony took place successfully at Portsmouth, on the 19th July, just seven months after her first keel-plate was laid.

As a material improvement, in many respects upon the "Astraea" type, a few remarks may be made upon her construction. She is built wholly of steel, with the exception of the stern-post, rudder-frame, and ram-shaped stem, which, as is usually the case, are strong phosphor bronze castings. The framing is a combination of the bracket and transverse systems throughout the length of the double bottom, but before and abaft it, and above the protective deck, the frames are formed of "Z" bars, with intermediate angle frames worked between them above the protective deck. The double bottom extends for a length of about 152 ft., and is well subdivided into watertight compartments, but the watertight flats to magazines and shell-rooms practically extend the double bottom well towards the ends of the ship. A strongly built protective deck, whose maximum thickness is  $\frac{3}{4}$  in., extending throughout the whole length, affords protection to the vital

parts, such as magazines, shell-rooms, and machinery, the cylinders of the latter being further protected from shell fire by a sloping Harvey-armoured coaming. The armoured deck is shaped like that of the "Vulcan," with a curve so deep as to extend down far over the sides, thus protecting a vertical streak of some 6 ft. or 7 ft. in width. The angle which this armoured deck makes with the side plating is about 45 deg., hence the  $2\frac{1}{2}$  in. plates with which it is covered present a horizontal thickness of  $3\frac{1}{2}$  in. of steel to the fire of the enemy. Thus the difference in displacement between the 5,600 tons of the "Eclipse" and the 4,360 tons of the "Astraea"—viz., 1,240 tons—is not only distributed over the longer and broader hull, but has given an extra thickness of nearly  $\frac{1}{4}$  in. diagonally through the steel armour—a very important consideration indeed. The French cruisers of corresponding type have a protective deck of about  $2\frac{1}{2}$  in.

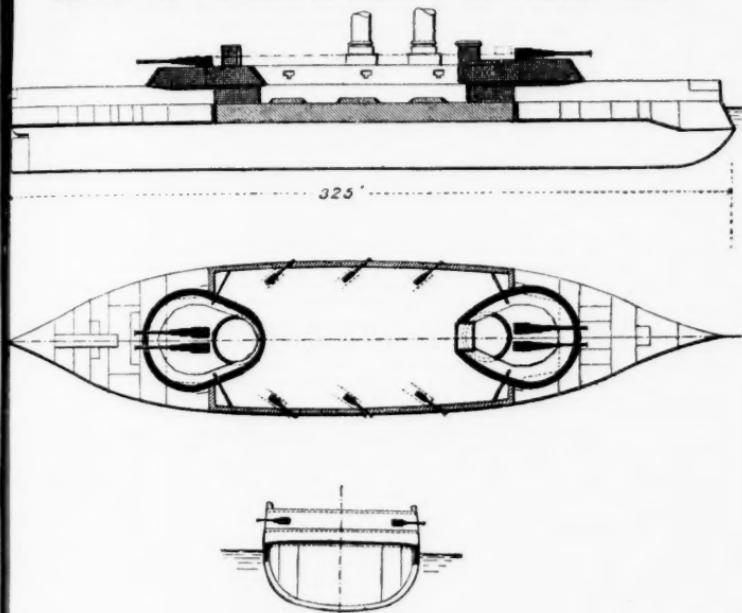
The conning tower is built of 6-in. nickel steel armour, the top plate being 1 in. thick; the upper part will be fitted with hinged covers all round for sighting purposes. The after shelter deck and forecastle will be connected by a fore-and-aft bridge. Two steel masts with wooden pole topmasts will be fitted; the question of fitting fighting top has not yet been decided.

The engines, which are under construction in the yard, will be of the triple expansion type, designed to develop 9,600 and 8,000 indicated horse-power, with and without forced draught respectively. In each of the two boiler rooms, four single-ended, cylindrical boilers will be placed, any one of which may be used independently of the other, with steam up to 155 lbs. 1,000 tons of coal can be carried.

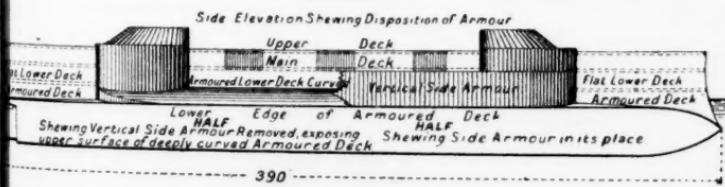
The dimensions, &c., are as follows:—Length, 350 ft.; beam, 53 ft. 6 in.; draught forward, 19 ft. 6 in.; aft, 21 ft. 6 in.; displacement, when fully equipped, 5,600 tons. She will be sheathed with teak, and coppered. Anticipated speed, 19.5 knots. The armament will consist of five 6-in. quick-firing guns, and six 4.7-in. quick-firing guns, which will be carried on the upper and forecastle decks, sponson ports being constructed so as to afford a better end-on fire than is obtainable in the "Astraea" class. The minor armament will contain eight 12-pr. quick-firing guns, one 3-pr. Hotchkiss, and four 45-in. Maxims. Three torpedo-tubes will be fitted, and ten 18-in. torpedoes will be carried.

We are indebted to the courtesy of the editor of the "Engineer" for the accompanying plan (Plate 46), which shows the disposition of the armour in the new battle-ships "Magnificent" and "Majestic." It will be seen that an immense development has been effected, when the disposition of the armour is considered and compared with that on the "Admiral" class for instance, whose comparatively meagre and insufficient defence is apparent at a glance. Although in the drawing the side armour is adverted to as vertical, it is not really so, but slopes backwards to a considerable degree, as the French plan of making the ship's sides "tumble home" has been adopted to a modified extent by the Constructive Department of the Admiralty. It will be observed that the old plan of starting the armoured side streak a few feet below the surface of the water has been adhered to, the thickest portion of the steel plates reaching to the level of the flat lower deck, which rests upon the crown of the arch of the armoured lower deck. Thinner steel armour is carried up to the level of the main deck. But the most important modifications are in the armoured deck and barbettes. The armoured deck, instead of being a mere flat roof to the citadel, curves downward on each broadside to the armour-shelf or lower edge of the side armour; so that in addition to having the side armour to penetrate, a projectile would meet with 4 in. of steel set at an angle which would give a further reinforcement of about 6 in. to pass through. The height of the curve of the armoured deck is about 9 ft., and it extends unbroken from apex to apex of the citadel. The barbettes rise at either end of the citadel and are pear-shaped, passing upwards through main and upper decks, and upon their summits will be revolving armoured hoods similar to those in the "Barfleur" and "Centurion." The bulkheads of armour which enclose the ends of the citadel are in reality merely a prolongation of the side armour, which is carried round thus to meet the barbettes at the central line, and they enclose the curved slope of the armoured deck, being built against it. Another important

## PLANS SHOWING DISPOSITION OF ARMOUR IN THE "ADMIRAL" CLASS.



## PLANS SHOWING DISPOSITION OF ARMOUR IN "MAGNIFICENT" AND "MAJESTIC."



Reproduced, by permission, from the "Engineer."

Resident was informed of these incidents he heard of the assassination of Lieutenant Huillard, killed in an ambuscade which the Sam-bori Peuhls had placed to entrap him. Captain Briquelot did not lose a moment. Ségou was denuded of troops, for Bodian had sent his contingents to aid in the defence of Sansanding. Nevertheless he found it possible with 100 men to bring in and bury the body of Lieutenant Huillard, and, moreover, to attack the Peuhl encampment at Boumouti and put to flight the contingents there assembled. But the numbers were disproportionate, and the small troop of Captain Briquelot lost five natives killed and 34 wounded, among whom were the only three European officers among them. It was therefore necessary to return to Ségou, whilst the Peuhls were overrunning the whole country. The French communications were soon cut off for some little time, and Ségou was blockaded as well as Sansanding.

Colonel Humbert, who happened at this time to be in the neighbourhood of Siguiri, returning to Kayes, at once sent Major Bonnier to take the direction of affairs in the north-east of the Soudan. Commandant Bonnier raised at Bammako an auxiliary company of tirailleurs, crossed the Niger on the 13th May, and joined his column to the force which Captain Briquelot had brought from Ségou, which now amounted to 1,000 of Bodian's men. On the 28th May he met the Peuhls, to the number of about 1,000, cantoned at Nonguella, put them to rout and pursued them. Catching them up again on the 3rd June at Ouo, on the Baguié, after a forced march of 40 miles in 24 hours, he killed 100 of their men and made numerous prisoners. The Guénié Kalari Province, which lies to the south-west of Ségou, was thus cleared of the marauding bands which troubled it.

This movement among the Peuhls, however, had been joined by the late rebellious insurgents of Baninko and of Minianka; so it was at Koïla, at 45 miles to the east of Ségou, in the centre of the province of Kaminiandougou, that the centre of the revolt was established. Commandant Bonnier having gone back to Ségou after the affair in Guénié Kalari, set off again on the 19th June, in order to attack Koïla. The rapidity of his march enabled him to surprise the rebels, who were forced to fly, leaving behind them over 100 dead bodies and 500 or 600 prisoners. Bonnier was next able to lead his column to the relief of Mademba, who was still blockaded in Sansanding, where he arrived on the 20th June. He was just in time, for El Hadj Bougouni had established his head-quarters in the village of Doséguéla, situated some 12 miles to the north of Sansanding, and his horsemen had ventured to approach within a few hundred yards of the town itself.

On the 25th June, Commandant Bonnier ordered an advance upon Doséguéla by the contingents of Bodian and Mademba, supported by some Senegal tirailleurs under European officers. On the 26th a fight took place under the walls of that place, and the Bougouni and Toucouleurs of Oumarel-Samba were put to flight; Oumarel-Samba was slain, and an attack was then made on the fortified village itself, which was held by Bambaras. A breach having been made by the artillery, Doséguéla was at last carried by storm. The chief of this

village, Niéné Taraoré, in company with 40 of his most faithful followers, blew themselves up with their magazines, and El Hadj Bougouni fled away to the north and reached his own dominion. The enemy lost over 300 slain, whilst the French on their side lost 16 natives killed and 120 wounded, including two European officers.

Thus, in less than two months, the double insurrections which threatened the French possessions of Ségou and Sansanding had been extinguished.

#### FIFTH PERIOD.

##### *Colonel Combes' Campaign, 1893.*

The general outlook of French affairs in the Soudan at the end of 1892 was somewhat critical, and, since Colonel Humbert had retired from the command, the direction of affairs in the Soudan was confided to Colonel Archinard by the Under-Secretary of State; and it was decided that the direction of the active operations should be given to Colonel Combes, who was appointed to the command of the Sudanese native regiment, now newly organized.

The task of Colonel Combes was more especially to isolate completely the territories which Samory governed, both from Sierra Leone, whence he procured breech-loading magazine rifles and ammunition, and from the Fouta Djallon, where he was able to exchange his prisoners as slaves in exchange for oxen and provisions. In order to carry out his programme it was necessary for Colonel Combes to occupy the valley of the Upper Niger, and to construct there one or more posts up the river from Kouroussa, hitherto the most advanced of the French posts in this direction.

In this high valley of the Niger, for some time past, one of Samory's best and most active lieutenants had been operating, by name "The Old Bilali"—a name given to distinguish him from his sons, also chiefs of the Sofas—who, in concert with Ténesso-Koba, another subordinate chief under the orders of the Almamy, guarded the provinces of Kouranko, Sankaran, and Kissi.

The expeditionary column, including a company of the Foreign Legion under Captain Destenave, was concentrated on the line from Kita to Siguiri, where it arrived on the 21st December, 1892. There the column was formed which Captain Briquelot was to lead into the valley of the High Niger; and between the 24th and 25th December the principal portion ascended the Niger in native canoes, which had been assembled for this purpose by M. Ballien, the commandant of the Siguiri district. The column arrived on the 30th December, 1892, at Kankan, having passed many villages, all ruined and abandoned, but without meeting any obstacles beyond several of the enemy's outposts on the crests of the neighbouring hills; and here the colonel decided to take the line of the Milo, from Kankan to Kérouané, as the base of his operations. After having reconnoitred the river and ascertained the depth of the channel, he perceived that it would serve him as a road for rapid communication from Bammako to Siguiri and Kérouané. All his information being of the most shadowy descrip-

tion, Colonel Combes determined to close with the Sofas as soon as possible; and on the 8th January, 1893, he reached Ouomi, an important strategical point on the left bank of the Milo. There two groups were formed: one, the column of the Milo, under the orders of Commandant de Gasquet, to guard the fords and to keep open the passage to the posts of Kérouané; the other, under the personal orders of Colonel Combes, for active operations in the field.

Colonel Combes left Ouomi on the 15th January, 1893, and arrived without incident at Konafadié, a large village situated south-west of Kankan, whence the Sofas, commanded by Samory, fled before the approach of the French troops. Some prisoners were able to give the dispositions of the enemy, whose object appeared to be to escape from the French advance by the south-east of Kérouané, from the Guéléba and from the Nafana, where the Almamy had placed in safety his wives, his corn, and all his goods.

Colonel Combes returned to the Milo, and by the 24th January established himself at Babila, 24 miles to the north of Kérouané, in a position which commanded the routes both from the east and south.

On the 25th January a flying column was formed which, under Captain Dargelos, could operate in the Kouranko and the Kissi valleys to the south-west of Kérouané, in order to intercept and drive back to the east any bands which ravaged that country. Orders were at the same time given to Captain Briquelot to drive back towards the valleys of the Milo and the Dion the bands of Bilali and of Ténesso-Koba.

A lightly equipped column was then formed to march upon Guéléba and the Nafana country, hitherto almost unexplored, and in relation to which only the most vague information was obtainable. This column included 103 mounted Europeans, men and officers; four companies of native tirailleurs, a squadron and a half of spahis cavalry, and 800 porters, carrying on their heads burdens of from 50 to 55 lbs. ( $\frac{1}{2}$  cwt.), equivalent to 30 days' provisions for the Europeans, and six days' supplies for the native African troops and bearers. Leaving the Babila ford on the 4th February, this column took its way rapidly to the east, where it surprised, at Guéléba, the principal bands of the Almamy—particularly that of the Chief N'Golo, who suffered considerable losses, and obtained possession of large stores of provisions. The bands of Samory always retreated fighting, and disputed the passes, fords, marigots, and rivers; burning, as they fled, all the villages on the way, with their stores of provisions, driving before them, like flocks of cattle, the unfortunate inhabitants, terrified by the cold-blooded cruelty of the Almamy. The French column, which marched early and late, often covered a distance of 24 or 27 miles, through a country full of natural obstacles, thereby overtaking the Sofas, who were thus surprised, time after time, whilst in the act of throwing up defences, palisades, entanglements of creepers, &c., at different points in the road, obstacles which, thanks to the rapidity of the French pursuit, were only just commenced, and never brought to completion.

In consequence of this system of harassing the retreat of the enemy, Colonel Combes was enabled to cause the enemy immense losses in men, horses, rice, honey, and kola nuts, provisions which largely assisted the food supply of the French natives, soldiers, and bearers, and also enabled the regulation rations of the white troops to be improved by abundant distributions of rice.

From Guéléba the column marched towards the south-east, towards the Nafana, a country thickly wooded with the strong vegetation of the Tropics; a country covered with jungle, impassable except where the narrow pathways under the trees seemed at times almost indistinguishable, and apparently inextricable. In addition, it may be noted that this difficult country is inhabited by a black race almost savage, and intersected by deep streams, full of water throughout the year, for it rains here for 10 months out of the 12.

This Nafana country was entirely traversed from north to south, and a region was arrived at wholly unknown to Europeans (where the inhabitants build their huts up in the trees, for the purpose, as we may suppose, of being out of reach of inundations), and the fighting throughout was incessant. The great danger for the French was their liability to be fired upon, anywhere and everywhere, from an enemy totally hidden in the luxuriant vegetation.

After having caused as much damage as possible to the enemy, the column retraced its steps. During this arduous march the French troops fought in 14 actions, on all of which occasions the enemy suffered severe losses. They marched nearly 560 miles, crossed 72 marigots with steep banks and full of water, 13 large rivers, and re-entered the post of Kérouané on the 33rd day, on the 10th March, 1893, without having lost a single European. They had 2 men of the Foreign Legion wounded, 4 tirailleurs and spahis killed, and 15 natives wounded. It was a remarkable exploit.

Meantime Captain Briquelot was operating in the upper valley of the Niger against the bands of the elder Bilali; but after his first march in the enemy's country, he was obliged to leave his guns at a post, on account of the delays which they occasioned in such a difficult country. Two encounters with the Sofas ensued at Douako and Yalinkoro, on the 14th and 24th January, when Bilali and his bands were driven southward towards the Kissi, whither the small column pursued them, again giving them a beating on the 3rd February at Bambaya. Bilali turned out of this place thoroughly dislodged, and would then have taken refuge in the thick forest to the west of the Kissi, but he was prevented so doing by the inhabitants, who, rising at the approach of the French, attacked the demoralized Sofas, and massacred them in large numbers in their villages wherever scattered groups of them had taken shelter. Bilali and his few remaining followers made their way back towards the north-west, where they were completely defeated, on the 5th February, in a fight at Nianforando, near Erimankono. The old Bilali escaped falling into the hands of Captain Briquelot, and took refuge in the territory of Sierra Leone; but all his baggage, supplies, and 4,000 prisoners fell into the hands of the French.

On the 10th February, Captain Briquelot's force arrived at Erimankono, where a post was established, and at the same time another post was constructed at Farannah, 24 miles to the east, on the banks of the Niger. It was then learnt that Bilali had left the Sierra Leone territory, where he had obtained assistance and was again in the field with the band of Bakary-Touré.

The French recommenced operations on the 1st March, when they attacked the enemy at Guérineba, where he sustained severe losses. The column next marched in a southerly direction towards Bambaya, where Bakary-Touré had taken refuge, which place was reached on the 18th March, directly after the enemy had struck their camp. But the Sofas drive before them such numbers of the inhabitants that it is easy to follow in their track. The trodden down vegetation in their passage forms, in fact, a broad road more than 20 yds. broad. By the 20th March the large village of Yalé-Kalédon was occupied by the French, and a large accumulation of supplies and provisions of all kinds was found there.

The French then experienced some difficulty in passing the Ouassoukou, a marigot strongly entrenched, which the enemy defended for more than 30 minutes. This obstacle having been surmounted, the pursuit of the Sofas was continued with vigour, their march being impeded by the numerous troops of slaves and cattle which they took with them. At last, during one dark and rainy night, the French surprised the African camp, which the Sofas had once abandoned, with all their belongings, and where the French made 4,500 prisoners. After sharp fighting, the Sofa bands retreated in disorder towards Bouillé, pursued by the spahis under Lieutenant Pouydebat, who dispersed them; and these bands, like those of the Kissi, beaten everywhere, deserted the country in small detachments towards the north-west, by the Milo, where they only encountered fresh difficulties.

Meantime Captain Dargelos, commanding the column of the Kissi, was then operating in the vicinity where Captain Briquelot was cutting up the bands of Bilali. This column, composed of a section of the Foreign Legion, 2 companies of native tirailleurs, 1 troop of spahis, and 300 transport coolies, was engaged in Kouranko and the Kissi country against the bands of the Ténesso-Koba, of the younger Bilali, and of Amara, one of the sons of Samory; and he left Babila on the 29th January. After making some arduous marches through a mountainous country this column arrived before Fidaoua, a large village fortified by means of stockades and saggars. Here, again, the Lebel rifles contributed largely to the demoralization of the Sofas, who were killed by the small-bore elongated projectiles easily penetrating the wooden planks of the stockades. Finally, the village was carried at the point of the bayonet, and the enemy suffered largely. The son of the Almamy was shot through the body, and only owed his safety to two of his faithful slaves, who carried him into the bush. The resistance was soon overcome, and upwards of 11,000 prisoners were captured.

These figures appear incredible, but it may be explained that the

prisoners were the captives whom the Sofas used to exchange for arms and cattle. These unfortunate wretches were conducted into the peaceful regions of the Soudan and set at liberty. At the present time they inhabit peaceful villages and engage in agriculture under French rule and protection.

On the 12th February, the section of the Foreign Legion was sent back to Kérouané, and the column kept on its way, scouring the neighbouring country and driving out the remnants of the Sofas.

The inhabitants everywhere came out to entreat the French to occupy their country and to rid them permanently of the presence of Samory's soldiers; and, by the 6th March, Captain Dargelos was able to re-enter Kérouané, having reduced the masses of the enemy into little bands and scattered parties, who at last joined the bulk of Samory's forces beyond the Milo.

Colonel Combes, having taken the precaution to guard by posts of observation established at Kénimbourg, Maréna, Mananfara, and Babila, the line of the Milo, these disunited detachments fell, one after the other, within the defensive zone of these posts, and suffered accordingly. Thus, on the 7th May, it was foreseen that one troop, formed of the *débris* of several bodies of Ténesso-Koba and Amara's men, intended to make its escape by night through a pass between the posts of Mananfara and Babila. In consequence, however, of the dispositions made by Lieutenant Delaverrière the Sofas were surprised and again completely defeated; Ténesso-Koba and Amara losing their state war-cloaks, 20 valued captives, all their papers, Korans, and their wives, &c. A few of them who managed to cut through, including the mother of Amara, joined Samory himself on the Dion, after having barely escaped capture by a detachment of spahis, under Lieutenant Hanteclouque, who hotly pursued them. The old Bilali encountered a similar reception shortly afterwards.

So in less than three months the expeditionary column had cleared of all Sofas the whole country west of the Milo river. The remnants of the large masses of troops which Bilali and Ténesso-Koba had so long maintained on the Upper Niger were destroyed, and, by the construction of the posts of Farannah, of Erimankono, and Kissidougou, the French were in a position to prevent Samory from easily providing himself with arms and ammunition from Sierra Leone.

At the beginning of April, Colonel Combes ordered the return of the column to Senegal. But previously he visited the posts newly established, selected a locality for the Residency on the Kissi, and despatched Captain Briquet, with Dr. Gallas and 100 *tirailleurs*, to completely explore a route wholly within French territory which should open up communication with the coast. Accordingly Captain Briquet set out on the 8th April from Farannah, and reached Konakry without encountering any opposition.

It is to be remarked that this notable campaign, which only lasted three months, and achieved such important results, cost the life of one European alone, a soldier of the Foreign Legion, who was killed at the taking of Fidaoua.

Whilst these events were transpiring in the south, Colonel Archi-

nard, who arrived in the Soudan on the 23rd January, 1893, heard of the death of Mounirou, the Sultan of Macina, to whose throne Ahmadou immediately succeeded. He at once made a hasty tour of inspection and proceeded to Nioro, the capital of Kaarta, where a re-organization of the provincial administration was necessary. He found the country quiet, the fields being cultivated, and trade with the Moors of the Sahara in full operation.

This activity in commerce is dependable on the attitude of the Moorish tribes. Whenever these Moors pillage a caravan the commerce is interrupted. The Ouled Nacer tribes, for example, still remained untamable. Colonel Archinard took immediate action. He at once prohibited the exportation of millet from the Kaarta over the border in their direction, for the Ouled Nacer Moors are unable to cultivate grain, which forms the base of their food supply. At the end of three weeks their chief came to Nioro with 300 men and 500 camels, and consented, in token of submission, to pay the French an annual tribute of 10 horses.

Colonel Archinard left Nioro on the 17th February, taking with him two small guns which he had left there in 1891. He proceeded towards Gombou, where he arrived on the 27th February. There El Hadj Bougoumi, whom Commandant Bonnier had well beaten six months previously at Doséguéla, came in to make his submission. Next he went on to Ségou, which he reached on the 14th March. There he learnt that the feebleness of Bodian, on one hand, and the intrigues of Ahmadou, on the other, had resulted in new uprising of the Bendougou and the neighbouring provinces of the Baninko and Minianka, whither had retired the bands of the Peuhls which had been broken up by Commandant Bonnier during the previous month of June. Colonel Archinard did not hesitate to depose Bodian and to put at the head of the Ségou district a French officer, whilst a column was organized to operate in the disturbed districts. With two companies of Regulars, Senegal tirailleurs, and four companies of auxiliaries, Archinard marched to the south directly upon Baninko. At Garo he crossed the Mayel-Balevel, and on the 28th March, after preliminary skirmishes, he beat the rebels at Kentieri. The next day he pursued the fugitives and completely defeated them at Mpesoba. After this fresh defeat the revolted Bambaras understood that it would be better to submit, and they delivered up the Peuhl chief who the previous year had led the revolt of Gnérié Kalari.

From Mpesoba the colonel pushed on north-east towards the town of San, whose chief, for a long time an ally of the French, had concluded with Commandant Monteil a treaty acknowledging the French protectorate. The Almamy of San came to meet the French column, and facilitated the provisioning of the troops. But this did not occur at Djenné when they arrived on the 11th April, after having recrossed the Mayel-Balevel as high up as Touara.

Djenné is a big town of 10,000 inhabitants on the borders of the Mayel-Balevel, which communicates with the Niger by a navigable marigot. It is a very important commercial centre under the suzerainty of Macina. Ahmadou, who had prepared for an invasion

of Ségou, was at Mopti, 30 miles to the north-east, with his contingents.

In spite of the king's proximity, the Toucouleur garrison of Djenné was not anxious to resist. But the traders of Djenné, deceived by the weak appearance of the column, thought themselves strong enough to overpower the French, and prepared a resistance which was all the more intense in its fanaticism because Djenné is a town celebrated for its Mussulman schools. On the 15th, Colonel Archinard had his guns placed in position and began to bombard the military portion of the town, which is situated to the west of the mercantile town. On the 12th, the breach being sufficiently practicable, the assault was delivered. Two French officers were killed, Captain Lespiean and Lieutenant Dugast; the native contingents lost about 30 men, and there were many wounded. But the enemy lost between 400 and 500 dead, and the principal merchants obtained the cessation of the slaughter. In order to conciliate the inhabitants of Djenné, Colonel Archinard had avoided bombarding the mercantile town, so that the next day material order could be re-established, and the merchants made haste to pay a heavy war indemnity.

The Toucouleur garrison had fled with their chief, Alpha Mouça. The column started in pursuit the day after, and after passing for the second time the right bank of the Mayel-Balevel, on the 17th April, entered Mopti, which the troops of Ahmadou had just evacuated. The chiefs of Macina, foreseeing that Colonel Archinard would march upon Bandiagara, the capital, had concentrated their forces on the road from Mopti to that important centre. It was actually at Kori-Kori that the encounter took place. The French had only four tirailleurs wounded after a short struggle, in the midst of which Ahmadou took flight. The King of Macina at once abandoned his capital, taking all his family in the direction of the Haoussa States. But Colonel Archinard, having entered Bandiagara on the 29th April, detached a flying column to pursue the fugitives, caught them up at the defile of Dalla, at a considerably long distance to the east of Bandiagara, and finally captured the *smala* (harem) of Ahmadou, who continued his flight almost alone, and his prestige was so irreparably damaged that Ali-Bouri, one of his most devoted adherents, at once submitted himself to French authority.

Colonel Archinard thought that it would be suitable to place on the throne of Macina a member of the great Toucouleur family; he, therefore, gave the crown to Aguibou, a brother of Ahmadou, who, for the last four or five years, when he was governing the province of Dinguiray, had given fairly satisfactory proofs of his friendly attitude; and, on the 5th May, he quitted Bandiagara, leaving as resident with Aguibou, Captain Blachère.

On returning towards Ségou Colonel Archinard made his way to Sansanding, and there, as at Ségou, he had to proceed to a re-organization of the country, the *Fama* Mademba not having been able to impose his authority upon his subjects. The kingdom of Sansanding was materially reduced; and the territories of Segala, of Monempe, and of Mampala formed, with Sokolo, the new district of Sokoto.

From Sansanding Colonel Archinard passed to Ségou, where he stayed from the 19th to the 23rd May, then on to Bammako, where he arrived on the 29th May, and he was at Kayes by the middle of the following month.

The effect of the rapid intervention in Macina, and the deposition of Ahmadou, dissipated an invasion which was preparing on the side of Ségou. The installation of the French at Djenné, where a post was established under Captain Gauterou, *Commandant de Cercle*, and the presence at Mopti of the Niger flotilla, under orders of Lieutenant de Vaisseau Boiteux, gave the French a preponderant situation in the valley of the Niger.

As soon as Djenné was taken, the people of Timbuctou sent emissaries to Colonel Archinard, protesting their desire to be at peace with the French, showing that Timbuctou was ready to open her gates to the protectorate of France.

#### *Recent Operations, 1893-94.*

It has been shown how, in 1893, whilst Colonel Combes, the dreaded "Couombo" of the Sofas, was pursuing Samory in the valleys of the Milo, of the Sankaran, and of the Bani, those large southern affluents of the Niger, Captains Briquelot and Dargelos, at the head of flying columns, destroyed the bands of marauding Sofas which Kemoko-Bilali, Samory's principal lieutenant, had established on the Upper Niger.

The centre of Bilali's operations, the large village of Erimankono, was occupied by Captain Briquelot, who established there a post, and, in order to prevent any renewal of offensive movements, other military stations were likewise established in the basin of the Niger, at Farannah, and at Mafendi-Cabaya, a village which lies in the triangle formed by the two superior branches of the Niger, viz., the Falico and the Tembi. This territory seems to be a dependency of that province of Kouranko which Samory had conquered some years ago, and which extends beyond the watershed of the Atlantic streams belonging to the British colony of Sierra Leone into the basin of the Upper Niger, which forms an integral portion of the French Soudan.

In order to keep a surveillance over the caravans going from the regions still occupied by Samory to the commercial centres of Sierra Leone, and likewise to prevent the import of arms and ammunition, it was resolved to establish an advanced post further to the south than that at Mafendi-Cabaya.

The operations so far effected in French territory had resulted in the complete dislocation of Samory's bands of Sofas. Some warriors passing the French lines had been able to rejoin the Almamy's contingents concentrated in the neighbourhood of Ténéton, at more than 300 miles to the north-east, where his son, Karamoko, assembled them in the Bouzie, near Mousardou. But a large number of Sofas were thrown back into the British territory of Sierra Leone, where they pursued their habitual depredations. In order to destroy these hordes, which had thus collected inside their colonial frontier, the

British Governor of Sierra Leone, Sir F. Fleming, decided to establish in close proximity to the English frontier a chain of posts parallel to the French line. Caglieri, Falaba, Dangowalé Sangbé, were also furnished with garrisons of black troops, native police, and West India regiments. The establishment of these last two stations only dates from the middle of last year. In addition he decided that an expeditionary column should be sent to the front, to drive out the colony of Sofas who had established themselves within the colony. This column, consisting of 400 men of the 1st Battalion West India Regiment and colonial police, in charge of Captain Lendy, was placed under the command of Colonel Ellis, and proceeded inland last November, via Bendu and the valley of the River Boum.

It is 10 years since the question of the frontier line between Sierra Leone and the French Soudan became a subject for *pourparlers* between the Governments of Great Britain and France. By an agreement in August, 1889 (the final ratification signed on the 12th March, 1890), the frontier was determined between the French Guinea Coast and the colony of Sierra Leone. Some time afterwards, on the 20th June, 1891, the French and English Commissioners precisely specified the frontier line between Sierra Leone and the French Soudan.

It appears that Lieutenant Gaston Maxime Maritz was stationed under Captain Bouvie, who was in charge of the post of Farannah, on the Upper Niger, within a few miles of the north-east corner of the Sierra Leone frontier. In September he left with a small force of Senegal tirailleurs and natives, and proceeded to patrol southwards, via Liah, Cabaya, Fodoya, Selia, to Socora, on the Falico river. Thence he followed up the valley of the Falico to Maricolaya and Sambadougou, in the Kouranko country, in search of the Sofas under Bakary-Tourré, who were devastating the Kono country across the British frontier. Maritz's march was continued to Morabaya, across the stream of the Babbe, and along the watershed between the source of the Babbe and the Falico. He next reached Birimba, Tantafarra, and Walbabba, at the source of the Babbe. When he got down south, as far as Foria and Tembi-Counda, at the head waters of the Niger, he was right in the angle of the frontier line, and here he halted on December 21st. Some stragglers from the bands of Sofas (which had been driven by the British out of Sedu on the 20th, from the east side of the Daro Peak, a conspicuous point of the Kong Mountains), in order to facilitate the escape of Bakary-Tourré, who had doubled back towards the Kouranko country, gave information to Maritz that the Sofas were encamped at Waima, west of Tembi-Counda, and north of Daro Mount, and a good opportunity for a surprise attack upon them was not to be lost, even if the Sofas were across the frontier, for now they were foes to the British as well as to the French. Maritz at once marched, and halted on the 22nd within a few miles of Warina, where the camp of the Sofas was indicated to him. After midnight he started again, and, with a full moon to assist his march, was able to deliver his attack on the camp at 4.30 A.M., on the morning of the 23rd. Ten of his men were

killed, and he himself (mortally wounded) only discovered before he died that he had been attacking the British West India Regiment and the Sierra Leone Frontier Police, under Colonel Ellis.

The late Colonel Ellis's official reports have been published in full,<sup>1</sup> by which it plainly appears how the whole affair was due to a wretched mistake; and the friendly relations with our neighbours, the French, are not likely to be disturbed by this lamentable occurrence on the frontier. Since this affair at Warina, another petty collision between French and the Colonial constabulary of Sierra Leone has been reported as taking place in Samoh, north of Free Town, but no importance need be attached to such a trivial affair. Some excitement, however, seems to have prevailed at Monrovia, in consequence of the French flag having been hoisted on the Cavally river, at the eastern extremity of Liberia. There is no doubt that the French would turn this river to better account than the Liberians can possibly do, but the left bank only is in their territory.

#### *Occupation of Timbuc'tou.*

Let us now turn from the south-west to the extreme north-east of the Soudan Français.

It has been shown above how Kayes had been selected as the capital of the French Soudan, of which province M. Albert Grodet was appointed Civil Governor, with Lieutenant-Colonel Bonnier as senior commanding officer of the military forces in the district. On the 17th November, 1893, when the season favourable for operations set in, the annual expeditionary column under Colonel Bonnier left Kayes towards the south-east, where the Almamy of the Sofas was reported as then besieging Ténétou.

By the 26th Colonel Bonnier had concentrated his column at Bammako,<sup>2</sup> and he at once crossed the Niger and advanced to the relief of Ténétou, which place, after a siege of five months, had now fallen into Samory's hands. It was easy to track Samory by the multitudes of corpses which he left everywhere behind him. It was not, however, until the 5th and 6th December that the French troops came up with their enemy, and two engagements took place on these two successive days, at Faraba, near the left bank of the Baoulé, and further south at Koloni, where the Almamy nearly fell into the hands of his pursuers. His "griot" (i.e., a confidential attendant, who some time ago had accompanied Samory's son, Karamoko, to Paris) was thrown from his horse and captured by the spahis.

After the fight the column returned to Ténétou (68 miles from

<sup>1</sup> See "Times," March 1, 1894.

<sup>2</sup> From Kayes, by rail, to Medine, 12 kilom.; from Medine, by rail, to Bafoulabé, 114 kilom., by left bank of Bakoy river. From across the Bakoy river to Diouleba, 43 kilom., by Decauville, narrow gauge line. From Diouleba, by water, to Badumbé, 38 kilom. From Badumbé, Lefèvre carts are despatched *via* Kita and Koandou to Bammako and Toulimando, 43 kilom. beyond Bammako, where the Niger becomes navigable.

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Bammako), where a post was established, and thence marched back to Bammako by the 17th December.

Colonel Bonnier as senior commandant *pro tem.* (the Civil Governor not having yet arrived at his post) now organized his column for an advance on Timbuctou. Two divisions were formed, one (including all the staff, 2nd and 11th companies of tirailleurs, six mountain guns)<sup>1</sup> to descend the river in boats under the commanding officer, and the other, including the squadron of spahis (regulars), 10th and 12th companies, and irregulars, with two mountain guns and all the horses and mules, to march along the north bank of the Niger through the country of the Touareg Tenguerebbe, where some opposition might be expected.

The 1st division reached Ségou by the 20th, where all dispositions were completed, and Colonel Bonnier started on the 26th, with his troops in boats and lighters, down the stream, whilst Colonel Joffre, of the engineers, in charge of the mounted division, left on the following day, calculating to reach Timbuctou some eight days after the arrival there of Colonel Bonnier's troops.

Meantime Lieutenant Boiteux, commanding the small flotilla at Mopti, pushed on, without waiting for the arrival of Colonel Bonnier's column, to reconnoitre, and whilst the expedition was embarking at Ségou. Lieutenant Boiteux well knew that Timbuctou was only too ready to open its gates to the French, but it was rightly surmised that the Touaregs of the neighbourhood might assume an aggressive attitude. Lieutenant Boiteux landed with only 10 men, and after a skirmish on the 23rd (?) December, when the Touaregs were dispersed by a few shells from the "Mage" gunboat, he took easy possession of Kabara.

Two days afterwards Boiteux with Lieutenant Aube, at the head of their blue-jackets and "laptots" (Senegalais boatmen), entered Timbuctou without resistance, a few rounds of shell from the mountain guns sufficing to put to flight the groups of mounted Touaregs who watched the French movements from a distance.

After the tricolor had been hoisted at Timbuctou, Lieutenant Aube was sent with a small party of "laptots" to receive the submission of some of the neighbouring villages. On the 28th he and his whole party, M. Ledentec and 18 "laptots," were cut off by the Touaregs in the swampy plain of Kabara, and destroyed.

By the time Colonel Bonnier's column reached Mopti the commander learnt of this disaster at Kabara, and hastening on, capturing and utilising all the boats he could lay his hands on by the way, embarked there the 5th Company of Tirailleurs, reached Kabara, and entered Timbuctou without resistance on the 10th January, 1894. The artillery, 2nd Company of Tirailleurs, and convoy of supplies were still three days in rear.

On the 12th January Colonel Bonnier started off on a reconnaissance towards some Touareg camps at three days' march towards Goundam. He took with him all his staff, Commandant Hugny, the

<sup>1</sup> Mountain guns, De Bange 80 mm. (3:15 in.) throwing a 13-lb. projectile.

5th Company and a detachment of the 11th Tirailleurs. The Europeans were mounted upon donkeys, whilst Captain Philippe was left in charge at Timbuctou with the half of the 11th Company, to be reinforced on the 13th by the artillery and 2nd Company, &c. On the afternoon of the 14th January a Touareg camp was captured with a large herd of cattle, and the column then proceeded against another camp of the Touaregs some distance further on, leaving a section of the 11th and a section of the 5th Company under Sub-Lieutenant Sarda guarding the camp and cattle. Towards nightfall the column reached an encampment at Dougoi, which was found empty and apparently evacuated. Here, at 4 a.m., 15th January, the Touaregs, who had assembled at a short distance, surprised the column asleep and with an insufficient watch in the camp where they had taken up their quarters for the night, thoroughly knocked up with the fatigue of the march and their previous campaign. No outpost pickets or patrols appear to have been posted or organized. Closely followed by numbers of warriors on foot, the Touareg horsemen appear to have dashed in among the piled arms and cut down the few sentries before they could give the alarm. A party of horsemen at the same time made straight for the headquarters, which had been fixed in an open space, thereby giving an easy access. A number of cattle let loose by the Touaregs contributed yet further to the general confusion.

Captain Nigotte, in charge of the topography, sleeping at the headquarters, was able to escape with only a slight sword-cut, and join, together with several other fugitives, Sub-Lieutenant Sarda's detachment at the camp in rear, which retreated in good order and reached Timbuctou safely.

Captain Philippe at once sent out reconnoitring parties to bring in as many as possible of the tirailleurs who had managed to escape, and a few were thus recovered. Lieutenant-Colonel Bonnier, Commandant Hugny, Captain Tapard, Lieutenant Bouverot, Sergeants Etesse and Gabriel, Europeans, together with 1 sergeant, 6 corporals, and 61 rank and file tirailleurs (natives), were killed; 95 rifles and about 10,000 cartridges were lost. Captain Philippe at once placed his small garrison at Timbuctou in a state of defence, and as he was able to dispose of 300 rifles and six guns, he was able to disperse any of the surrounding bodies of Touaregs from approaching too near his lines, and to await the approach of Colonel Joffre's column.

Whilst these events had been transpiring, Colonel Joffre's column, composed of one company and a half tirailleurs, a squadron of spahis, 30 irregular spahis, 2 mountain guns (80 mm.) with all the horses and mules of the 1st division, had marched by land *via* Sansanding, Moninpé, Nampala Lère, and Soumpé, having crossed the Niger at starting from Ségou on the 27th December. The march was somewhat delayed by the difficulty of obtaining forage and corn for 250 horses and 1,000 natives in a country which was hostile, as well as by the inundated state of the Niger, which was exceptionally high between Lère and Timbuctou.

The column halted at Nampala, from the 7th to the 10th of January,

and arrived, on the 16th, at Soumpé, having taken a route across a deserted country to avoid the inundations. The Chief of Soumpé accompanied the French force onwards. Nioukou, the Chief of Niafunké, having threatened the French envoys, a company of tirailleurs, with the cavalry and guns, were sent, on the 20th January, against that village, which was found to be nearly surrounded by a marigot 2 kilos. across and 3 ft. in depth. 400 warriors were drawn up to contest the advance of the French, and at the first shots they charged to within a few yards of the French line. Upwards of 100 were killed by the French rifles; the rest fled, and the village was taken, without a casualty, by the column. Two other villages, Micore and Alta, were found evacuated at the approach of the French, and by the 26th, Captain Pouydébat, after a night-march, arrived at daybreak opposite Goundam, which is on the left bank of a broad marigot, but he was unable to possess himself of the boats which the Touaregs had removed across to the other bank of the stream, which was here 300 yds. broad with a rapid current.

Captain Prost with a squadron of spahis and half a company of tirailleurs, then in rear, proceeded to Tinghirma, on the Niger, where he arrived after ten hours' march by night and captured a quantity of corn and four boats. The villagers made some resistance and lost about thirty men. One tirailleur only was wounded on the French side. These boats were brought to Goundam the evening of the 31st, and their appearance caused much commotion among the Touaregs, who assembled at the point of disembarkation, but they were speedily dispersed by a few shells, and fled during the night. The last had disappeared by the morning of the 1st February, when the passage of the marigot was commenced. On the 2nd, the gunboat flotilla, which had been warned by French scouts, arrived at Goundam, and brought news to Colonel Joffre of the surprise of Colonel Bonnier's reconnaissance on the 13th January. The whole column had crossed the stream by the 3rd February. The Touaregs fled towards the north, and a reconnaissance sent in that direction failed to come up with them during a search of four days.

On the 7th February the column commenced its march to Timbuctou, and on the 9th reached the scene of Colonel Bonnier's surprise. The bodies of the officers and non-commissioned officers were found and carried to Timbuctou, where Colonel Joffre's force arrived on the 12th February.

During this march of 434 miles, the French lost only two native tirailleurs by sickness, and one native tirailleur was wounded.

Such, briefly, are the principal incidents connected with the occupation of the capital of the Western Sahara by the French.

Colonel Joffre's force, by the end of February, had finished the construction of a blockhouse at Kabara, commanding the landing-place, and the construction of an entrenched fort at Timbuctou was approaching completion by the end of March.

The principal chiefs of the sedentary tribes and the heads of villages in the neighbourhood soon came and gave in their submission, acknowledging the French Protectorate.

On the 3rd of March Captain Gautheran, with 40 tirailleurs and a machine-gun (Hotchkiss), marched against the Touareg camps at Takai-Gourou, dispersed the Touareg horsemen there, killing several, and captured 80 of their sheep and 50 asses. In another direction, on the 5th March, Captain Prost, at the head of 225 Soudanais auxiliaries, 80 spahis and 2 mountain-guns (80 mm.), surprised a large band of Touaregs near a marigot, killed a number of them, and seized a herd of 1,000 sheep, without a casualty to his own men.

The effect of these raids was soon indicated by the envoys of the Touareg Tenguereguif coming in to request an amnesty, which was granted, on condition that five of their notables would reside permanently at Timbuctou, and that the movements of the camps of these nomads were constantly reported, whilst a fine of 1,000 sheep was required to be delivered within 20 days. These conditions not being complied with, Colonel Joffre marched against the encampment of the Touareg Tenguereguif, between Lake Goro, near Diré, and Lake Fati. On learning the approach of the French, the Touaregs prepared to resist them in a position taken up near Lake Goro, where they were speedily dislodged on the 23rd March with great loss, their chief and his principal lieutenants being slain. On the 25th they were again attacked in their camp and driven into the country between Lake Fati and Goundam. Colonel Joffre's column captured on this occasion 59 horses, 30 camels, 8,000 sheep, 400 oxen, and 200 asses, whilst the bodies of 120 Touaregs were found on the field of action. Only one of the Tenguereguif chiefs escaped, having been badly wounded at Goundam, had remained at Farash with a few partisans. All the other chiefs were killed, and, in fact, the tribe has practically been extinguished. The news of this exploit has caused a sensation throughout the Sahara, and must inevitably spread the prestige of the French flag, which might have been endangered had the disaster of the 13th January been allowed to go by unavenged.

The sedentary populations of Timbuctou and the neighbourhood have soon begun to feel the good effects of the reassuring presence of the French troops. The word quickly passed that security reigned in the town, and caravans and lighters from Diaréfaré, Mopti, Bandiagara, and Djenné have commenced bringing corn, millets, nuts, and rice, so that the scarcity and distress which previously existed, owing to the exactions of the Touareg tribes, has already ceased. The position of the French garrison at Timbuctou is now assured, and its communication by steam, on water and railway, with Bafoulabé, is only a matter of time.

Colonel Joffre has carried off the honours of the campaign; the march of his small force along over 434 miles (700 kilos.) by land, leaving the banks of the Niger and proceeding north-east, by Lère, over difficult, broken ground, almost destitute of supplies, must be regarded as a very successful exploit. His bringing in all his men, horses, and animals, after six weeks on the line of march through a hostile country, with hardly a casualty, averaging 14 miles a day, is

excellent work, and exhibits the qualities of the few French officers who carried out this creditable operation, under Colonel Joffre's orders.

(It may be compared, in a small way, with Sir Frederick Roberts' march of 320 miles from Kabul to Kandahar, where the average was also about 14 miles *per diem*, but under a higher temperature; but, of course, the achievement of Roberts' force was a greater feat of endurance, for the marching was more continuous.)

It is by such achievements as those briefly sketched in the foregoing narrative that France has acquired that vast territory which has now received a political and administrative autonomy as "Le Soudan Français," comprising the whole country drained by the upper channels of the Niger and Senegal river systems. Its boundaries will serve to show its importance and extent. To the west it is now bounded by the French colony of Senegal and Portuguese Guinea; to the south-west by Fouta Djallon (a dependency of French Guinea) and Sierra Leone. Towards the south the frontier meets Liberia and the French Ivory Coast; whilst to the south-east are the British possessions of the Gold Coast. Towards the east, as also to the north, the delimitations of the French Soudan are not yet strictly defined, and must long remain uncertain; but the region now opened to French influence undoubtedly extends from Lake Tchad to Tripoli; whilst the whole of the Sahara, as far north as the limits of Morocco, from Cape Juby to Ghadames, cannot fail to acknowledge, sooner or later, the French Protectorate.

But a few years ago the French power did not reach beyond the basin of the Senegal, but by the prowess, perseverance, and gallantry of men like Archinard, Combes, Humbert, Bonnier, and Joffre, the tricolor has been carried far beyond, towards the interior, and, as we have seen, the whole of the Upper Niger now serves as a highway for European commerce, and a French garrison is firmly established at Timbuctou, the trade centre of the Sahara nomads, who are especially susceptible of military prestige. From Bakel, on the Senegal, to Timbuctou, the distance is some 600 miles and more. From Nioro, on the edge of the desert, to the Sierra Leone frontier, it is not less than 430 miles. The acquisition of this immense domain has been arduous, but the results are satisfactory, and will be profitable to the French nation. France may well be congratulated on the behaviour of her colonial forces. The Senegalais Tirailleurs, and Spahis, led by French officers, have uniformly distinguished themselves by their steadiness, tenacity, and endurance, both on the line of march and when encountering hordes of a fanatical enemy, which have nearly always far outnumbered them during the innumerable encounters by which they have deservedly gained possession of this wide and rich country. It is in order that the gallant deeds of our French comrades in arms during their recent campaigns with Mahomedan fanatics in the Soudan may become better known to officers of the British army abroad, who may not have the opportunity of reading the French accounts of these military events, that this slight description of them has been drawn up, in a very con-

densed form, from more voluminous reports<sup>1</sup> by the present compiler.

The CHAIRMAN: I will just make a remark or two before inviting discussion. We must all rejoice in having had laid before us a statement of the operations which have been undertaken by France during the last fifteen years; a statement of facts which, though I dare say known to experts, are very little known to the British public at large. I think also everybody must have rejoiced in what we have heard of the skill and gallantry and enterprise of our French comrades, and particularly in the introduction of peace and good order in that most distressful country, I say, advisedly "distressful country," because you have all recently read in the papers, in connection with Colonel Ellis's expedition, of the horrors committed by those atrocious bands of Sofas who ravaged the country. At first, when this lecture was proposed, alarm seemed to be felt by some lest we should enter on a thorny path and contentious matter that might give trouble. I do not think this is at all to be feared. The tone of the lecture speaks for itself, particularly in connection with what I told you of its origin. This institution, you will quite understand, has no other object than to propagate information as regards facts which are of interest to us all. I am delighted to see present my friend the French Military Attaché, and the French Naval Attaché, his colleague, who, if they will throw some light upon the operations described will be conferring a great pleasure upon us. Before inviting you to offer any remarks upon the lecture, I would merely call attention to one point of the description of the populations that are dealt with, viz., the "Toucouleurs." I wish the lecturer had been here himself to give us an explanation as to where he got the singular derivation of "two colours" from, but possibly some one may be able to throw light upon it. You will recollect the lecturer says the name "Toucouleurs" had some reference to the English occupation of St. Louis and Senegal many years back, but I doubt whether that is more than a popular superstition. If any one will aid us by throwing light upon these matters we shall be glad.

Major LE COMTE DUPONTAVICE DE HOUSSEY: I am not able to give any further explanation than that to which we have listened with such great interest. I have been very much gratified in listening to this lecture and also very much instructed. I have been gratified because I feel in all the words that have been said a spirit of good friendship for your comrades in France. I beg on this occasion to say that this friendship is quite the same on the other side.

The CHAIRMAN: Ladies and Gentlemen,—I am greatly indebted to Count de Heussey for his remark. I can only say further that if in thinking of these operations a feeling of envy may have arisen in any of our minds we need not to make great research into metaphysics to distinguish the character of that envy. There may be envies of different kinds, and if any was felt it would have been of a noble kind—leading to honourable emulation and a desire, in our sphere, to follow the example of the French in bringing civilisation to these regions. I will endeavour to make my own contribution to the discussion by speaking of the interest excited in seeing once again, as compared to our own method, the French method in starting and organizing a colony. It calls to mind the old history of North America. I would invite you to think of what the names are that you find now on the map over that vast region. The names of Lake Superior, of the great towns Detroit, Duluth, Qu'Appelle, and many others too numerous to mention, are just relics of the old French exploration under Government supervision and leading. Our method is rather to follow the trade; I think both have something to learn from each other in this matter. Conspicuous in the French management is the study which they devote and the qualities they show in understanding the

<sup>1</sup> *Vide Supplément du "Temps,"* du 28 Septembre, 1893; "Revue Française de l'Étranger et des Colonies et Exploration;" "Gazette Géographique," 1893-94. The sketch map of the Soudan has been reproduced, with permission, from that given in "Le Temps" of 28th September, 1893. The other maps from the French Military Service maps.

people with whom they have to deal. I have here a very interesting French book from the library, the "Senegal and Niger," giving an account of the operations from 1879 to 1883, published in 1884. It contains one or two photographs, notably one of the railway bridge at Bafoulabé, about 300 miles from the coast, which will give the practical Englishman something tangible to note as to the material progress which has been made. A quality that I think we often lack rather is the power of taking pains to understand our neighbours, and this applies equally, I think, to understanding the operations of our civilised neighbours, and to understanding the natives and other people who are subordinated to us. Such a lecture as has been given to-day is valuable to correct any ignorance of what our neighbours, the French, have been doing in these countries. I am sure there are many Englishmen you pass in the street, otherwise very well informed, who would say, "Oh dear me, I should like to know what business they have got there," little knowing the laborious efforts, the result of, you may say, centuries of work which have culminated within the last few years, giving them their title. Somehow we certainly, as a nation, have learnt very little, until lately, about the natives beyond our own borders, in West Africa. West Africa has been a sort of *terra incognita* to us, and even now most of us think that while the people on the coast are negroes, uncultivated people and savages are to be found all the way into the interior. We have little other idea than that of the "Great Dark Continent." In speaking of Africa, the "Great Dark Continent" was thought to be an admirable expression, covering the whole field; whereas, as I think those who have listened to this lecture will understand, it is quite a partial description. In the regions of the Upper Niger, the natives, many of them, are people—those at least of the upper classes—who use the Arabic language and written character, and are certainly not to be considered as savages at all. As to the material advantages that we have to hope for from the restoration of peace and good order in these countries, we know that in the portions of the coast line which we possess, commerce is carried on and goods are imported and go into the interior away out of our ken. It, therefore, certainly is useful for us that we should know something about the populations to whom they go, what their demands and requirements are, and it must be important to us that they should be at peace and multiply, and become better customers. The subject is made rather difficult to us by what I may call the curse of Babel, which comes down to us in the different names by which the same peoples are represented. There was a name which struck me with great wonderment when I come across it in this narrative—I mean the "Peuhls." I thought it a very queer word. I made enquiries and found that the "Peuhls" are what are known as "Fulahs." Again, I find in that excellent book, Brockhaus' "Conversazion's Lexicon," that the Germans class them under the name of "Fellatash," and the other collateral names under which these people are known are given, and you may, therefore, understand that Peuhls, Fulahs, and Fellatash are all the same. It is to be hoped that we may by free intercourse some day arrive at a common method of recognising these and other peoples. These Peuhls, coming originally from the east apparently, established themselves about the head waters of the Senegal and Niger, and after that, about two centuries or less ago, migrated again eastward across the Niger, and there connected with the Houssas, a name familiar to us as many of the fighting troops for our operations in Ashanti and elsewhere are Houssas. The Houssa States, between the forks of the Niger, *i.e.*, between the Niger and the Benue, were largely formed by people allied to the Peuhls, or Fulahs. As regards *Toucouleurs*, that word, according to the "Géographie Universelle" of Réclus, which I should think would be the best authority, is derived from the name of the country where they live, that high country to the south-west of the Senegal, the Futa Jalon, once called Tacurol. The Portuguese, who were the earliest settlers, found this name and took up the name of the inhabitants as Tacurores, and I think from Tacurores to *Toucouleur* is a very easy stage. Again, in that book to which I referred just now, "*Toucouleur*" is given as a corruption from Tacurol and Tacurores.

Captain LE CLERC: I have been in Senegal for two years, and I know the "*Toucouleurs*" had nothing to do with the British. There is Portuguese blood mixed with the population, but there is no English blood there. The Portuguese

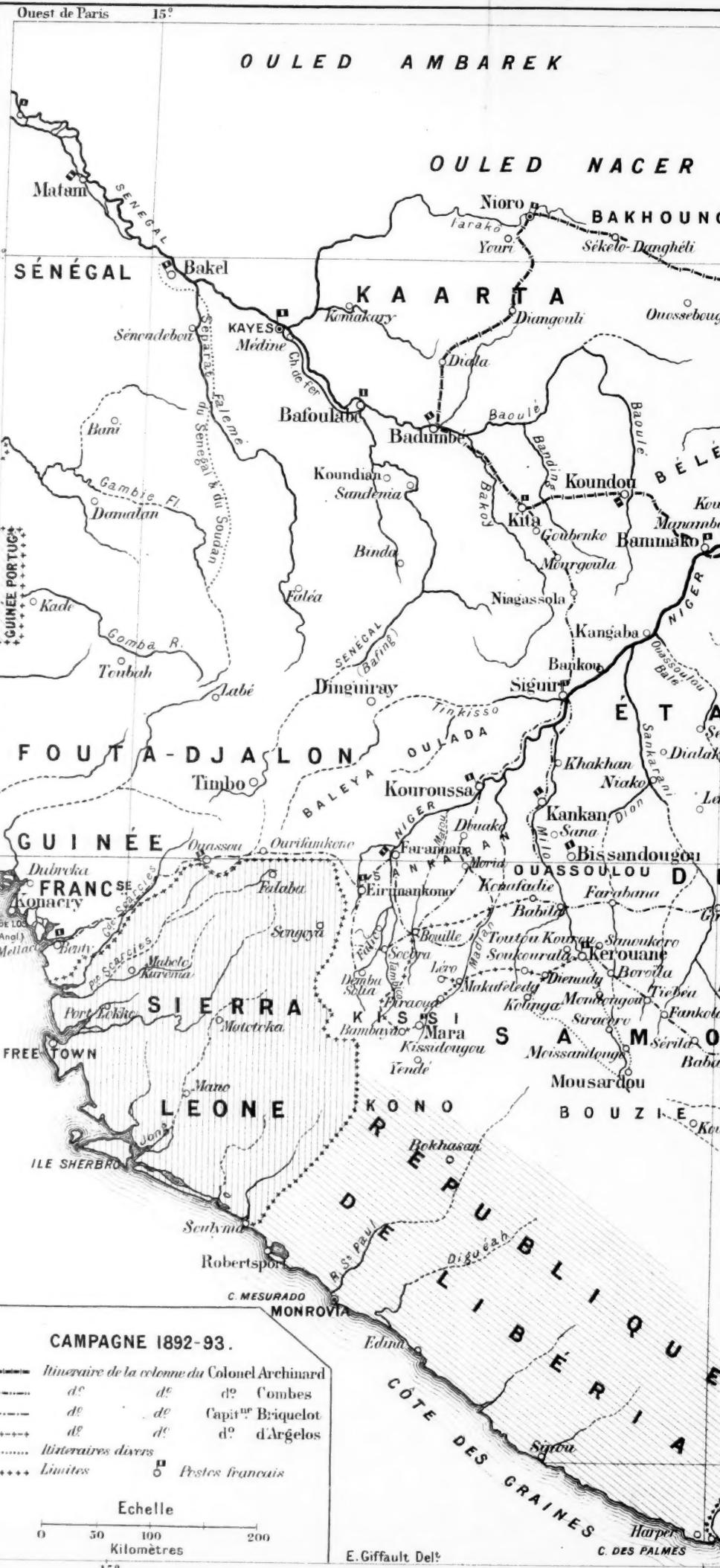
were there in very early times, as they were also in the Canary Islands. No doubt the Normans have mixed up to a great extent with the Negro population of the border, but that is not the reason why we call them the Toucouleurs.

The CHAIRMAN: There is nothing better known to philologists than to give a name a fancy derivative, based on a real resemblance in sound. I think we must be very grateful to Captain Oliver for the lecture which he has prepared, and for the clear way in which he divides his subject into periods: the first period, the advance to the Niger up the Senegal; the second period, the exploration down the Niger; the third period, the consolidation on the Niger up to Ségou; the fourth, *the first expedition south against Samory; and the fifth, the second expedition, up to a few months ago.* Inquirers who wish to get up this subject will find in the Library Stanford's "Compendium of Travel," 1878; the more recent edition is of 1884; a still more recent book is "Historical Geography of the British Colonies" No. 3, "West Africa," 1894, but in it, so far as I was able to examine it, I do not find any résumé of the French conquests of the most recent years, and the word "Sofa" does not appear in any of the books that I consulted. Events in Africa succeed one another very rapidly, and I really think publishers who look after these matters should be prepared to give us the latest information at frequent intervals. In thanking Captain Oliver for his lecture we must also thank Captain Maude for his labour in bringing it before us.

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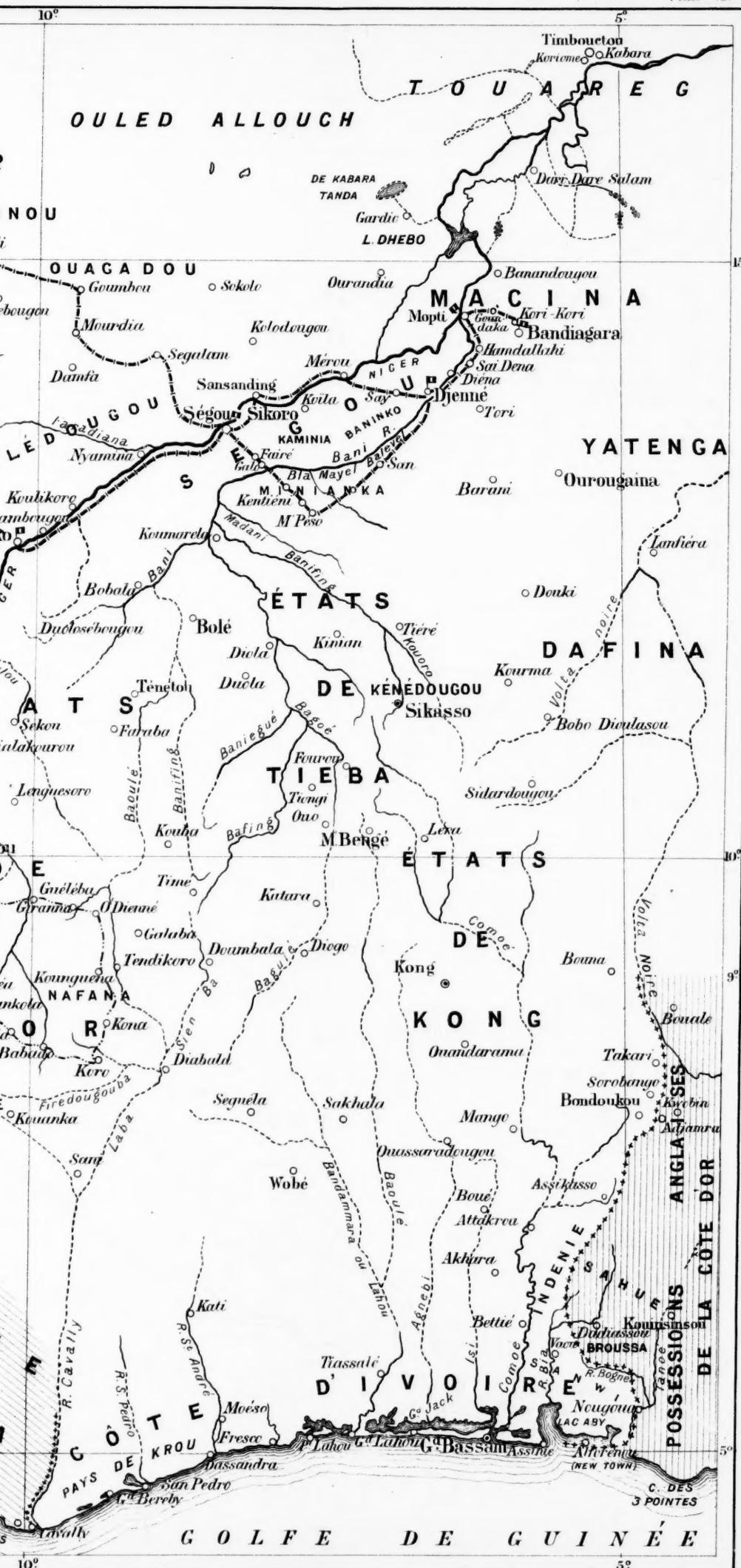
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## UDAN FRANÇAIS.

Plate 43



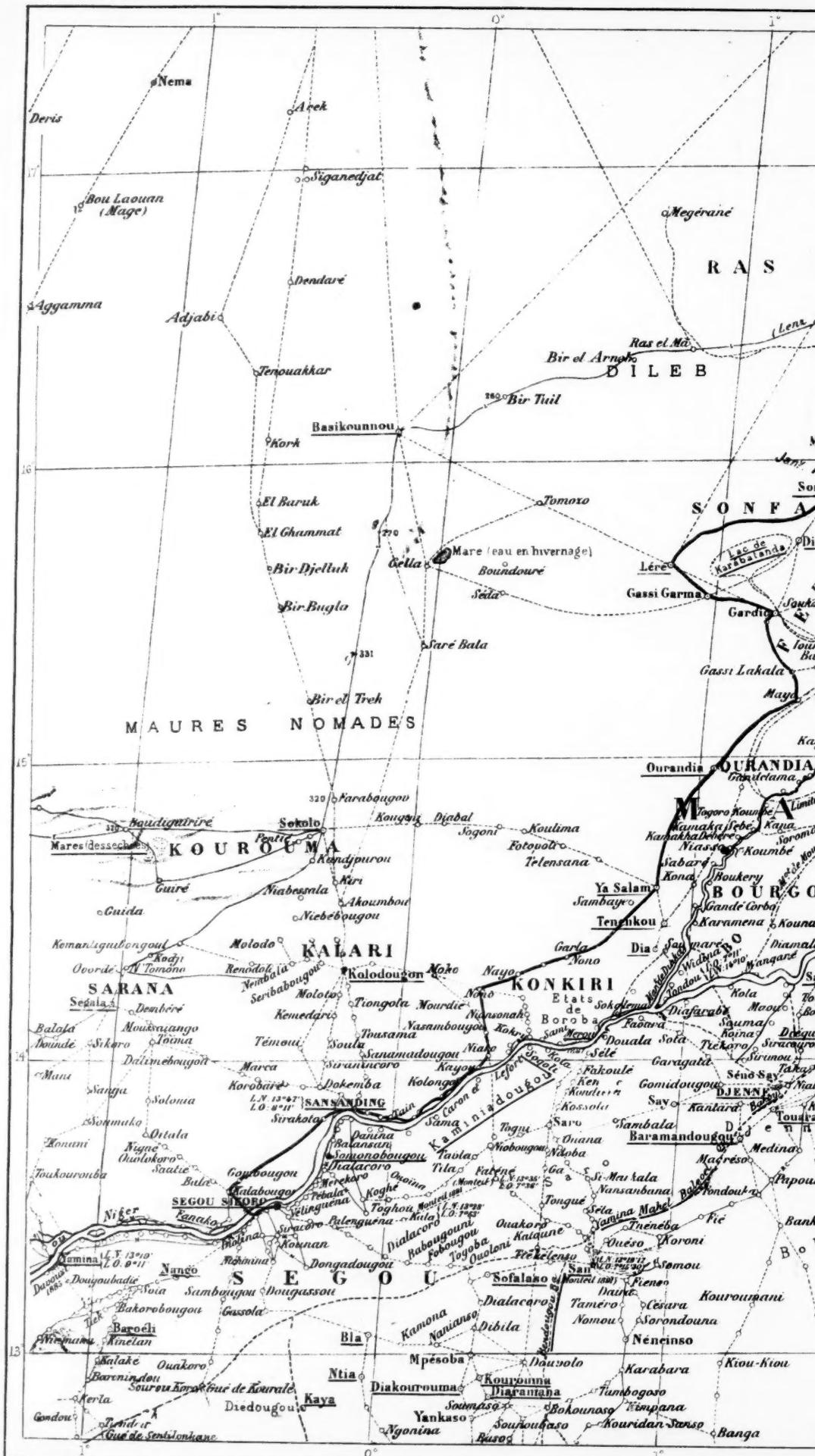
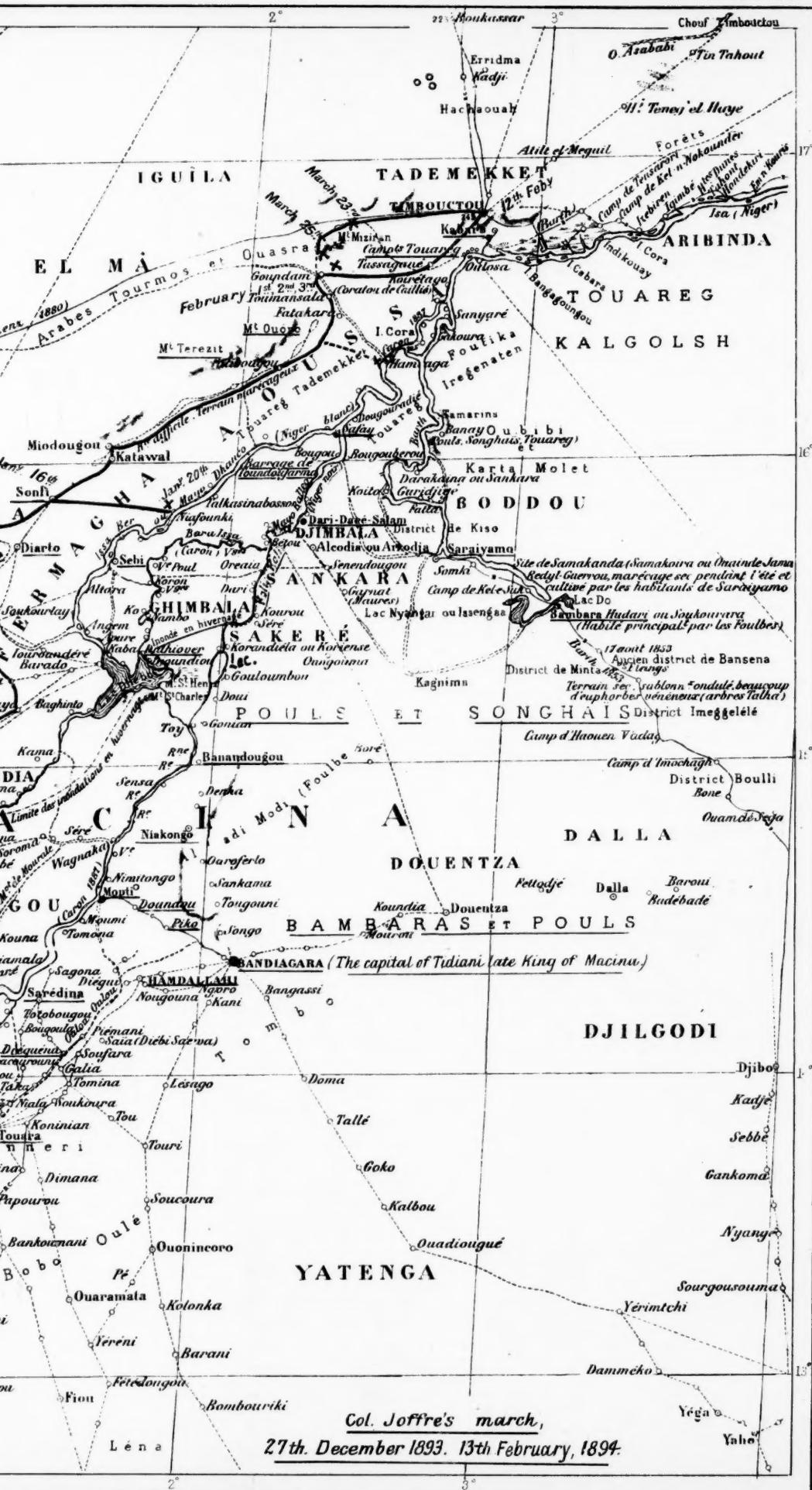
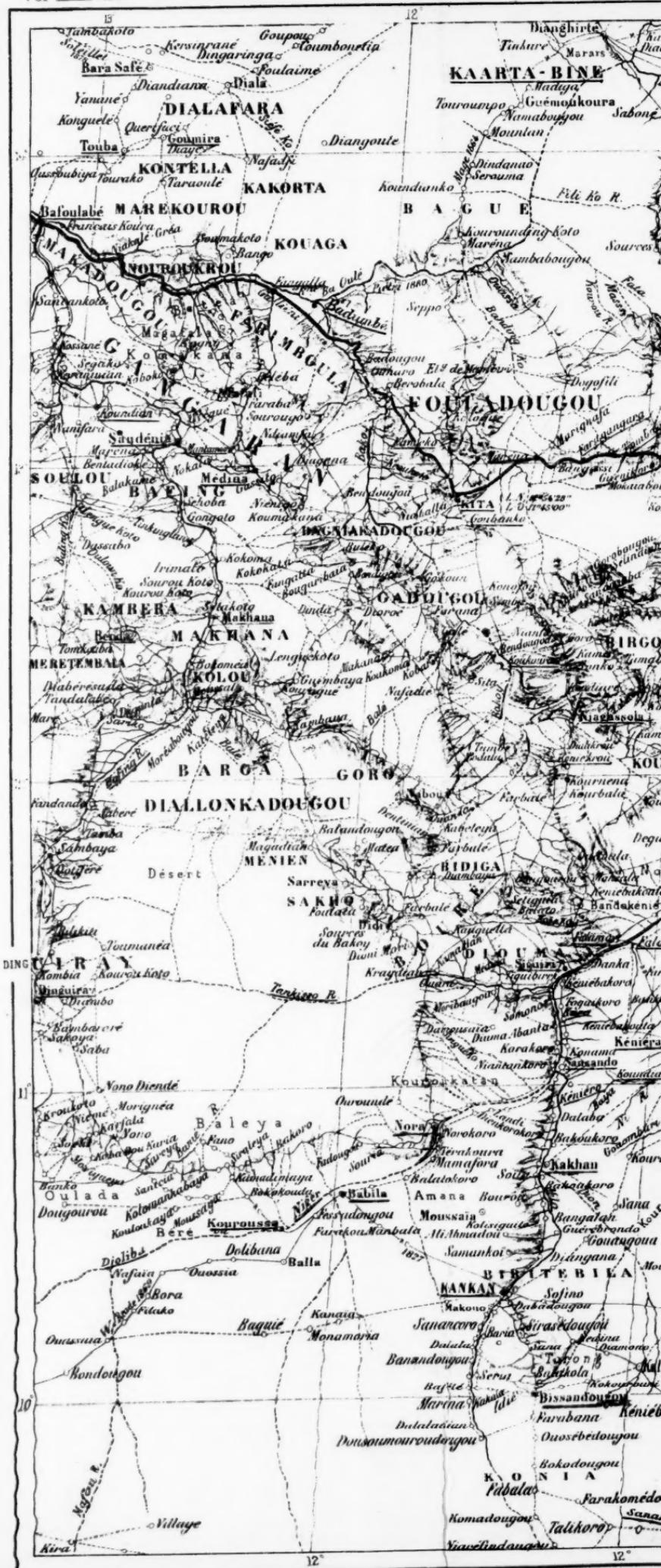
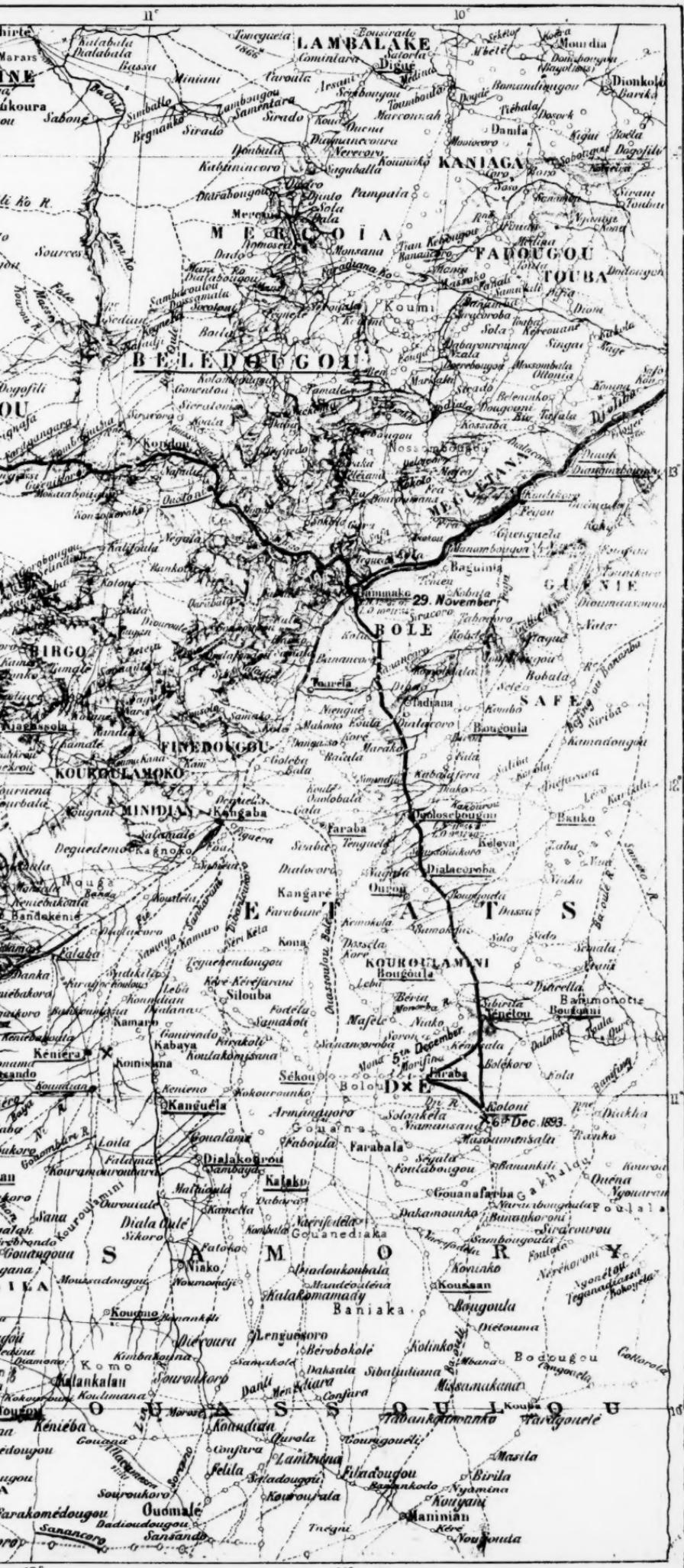


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## OCCASIONAL PAPERS.

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### SCHOOL SWORDPLAY.

By CAPTAIN A. HUTTON.

HARDLY a year ago Lord Methuen, an officer whose opinions on swordsmanship have to be respected, spoke with decision about this. "I believe," said he, "that if you are to introduce any system of fencing into our army it will be extremely difficult to find the material on which to work unless you induce the boys at public schools to learn." This was said in support of certain remarks of mine made at the Royal United Service Institution last year; and he further said "It will not be a plant that you will find grow naturally in England, you will have to nurse it."

In the old times down to the early part of this century there was no more popular sport in England than what was known as "cudgel" play, which may be regarded as the amateur form of "backsword," the sturdy sharp-edged weapon of the 18th century prize-fighter, but since then its popularity has certainly sadly diminished; the cause of this, however, is scarcely a matter for present discussion. If it is to be revived to any extent in this country it must certainly receive that nursing which Lord Methuen prescribes for it, and it is in the public schools and in those which follow their lead that this nursing should be applied. But how? I was of opinion that all boys in army classes should be made to learn, that it should form part of their education, but I am inclined now to modify my views for two reasons—Firstly, because I am afraid that if swordsmanship were to be included among the subjects of examination, a vicious system of fence would be forced upon us, and in the Service we have already had enough of that kind of thing; secondly, because recent experience has shown me that it is quite as easy to attract boys to this fencing room as it is to order them there.

This experience of mine is based primarily on my connection with the London Rifle Brigade, which has attached to it a cadet corps, and these lads, who vary in age from about 14 to 18, are entitled to attend the regimental school of arms; of course they all commence work with the foil, but it takes much application and many lessons to become even moderately proficient with that weapon, so by way of making the studies palatable we gradually introduce various feats of historic fence; many people on first seeing a bout of "rapier and dagger" or "case of rapiers" fancy it to be very difficult, whereas, on the contrary, it is extremely easy, as may be understood, when we

consider that these arms belong to a period when fencing was in its infancy, and its movements, owing to the weight of the weapons, were of the simplest kind. When then the pupil has advanced a certain extent in his foil play, we interest him by teaching him, especially if he is a little fellow, the lightest form of historic fence, that of the dagger combined with the cloak, the manipulation of which although it looks complicated is really not particularly so, and this, if he is intelligent and active, he will learn in two or three lessons, and he can then have the amusement of loose play with these arms, while he continues his studies of the modern art all the more keenly; when we judge it expedient we introduce him to single stick, which presents no difficulties to him, because in our system his foil play leads him directly into it, and as he grows bigger and stronger we put into his hand the long Spanish rapier and dagger, upon which he has for some time been casting longing eyes, for he has seen them wielded in exhibitions of swordsmanship by the cracks of the school, and he begins to dream of like honours for himself, nor will he be long in attaining to them if he works well; from this to the rest of the 16th century combats the steps are easy, but he is never allowed to lose sight of the fact that foil play, as taught by the great French masters, is the foundation of the art, and he becomes so imbued with the idea that he never misses a lesson if he can help it; in course of time he becomes a very useful member, because we make it a practice, when he has arrived at a certain degree of proficiency, to allow him to take in hand some beginner, and by this means he acquires a skill in imparting instruction which will enable him at some future time to form a centre of swordsmanship in any place in which he may happen to find himself. In the L.R.B. school the effect of cultivating the ancient forms of fence as well as the modern has been that the youngsters have attained to such an eminence in the use of the various weapons, that a team of them were specially invited by the "Cercle d'Escrime" of Brussels to take the most prominent parts in the splendid *Fête d'Armes* at the Monnaie Theatre last May, a pretty considerable honour for young lads of 19.

It may be suggested that these cadets of our crack Volunteer regiments must as such have a special natural turn for arms, and that the same success would not accrue among a differently constituted body of boys. Fortunately we have had an opportunity of testing this. About a year ago I became acquainted with one of the masters of Bradfield College, to whom I explained my views; he told me that they were exactly the kind of thing that would delight his Head, and when the school reassembled I paid him a visit of a couple of nights—a Saturday and Sunday—and spent a matter of two hours with him in the school gymnasium; I found fencing taught to a small number of boys in a desultory fashion by an instructor of the usual army type, but who, luckily, was willing to learn, and I showed him and them a few important things which they could work on afterwards, and they did work on them. Before I left I arranged, in response to a request of the head master, to bring down a party of L.R.B. boys to show those at Bradfield what an attractive game

swordsmanship can be made, and when this exhibition of fencing was over I pointed out that it only rested with themselves to learn to do everything that they had just seen, and that if it suited the views of their head master I would pay them a visit of a few days with next term and show them how to do it. This took effect at once, for the boys sent a deputation to me to beg that I would remain there one more day and show them something further, which of course I arranged to do; and shortly after my return to London I received a letter from one of the prefects reminding me of my offer regarding the next term; and on revisiting them last February I was much gratified to find that some of the masters had become as enthusiastic as the boys, and that two of them had set themselves to master the art of giving instruction.

When I and my party were staying at Brussels rehearsing for the *Fête d'Armes* I kept my Bradfield friends *au courant* of all that took place there, and sent them the *libretto* and the various newspapers, the accounts in which fired them all, from the head master downwards, with a desire to emulate the Belgians.

They have close to the college gates, in what was once a chalk pit, surrounded by dense foliage, a complete Greek theatre, designed after some of those still to be seen among the ruins of the ancient cities, and this picturesque spot was made the scene of operations; they consisted of an entertainment of acting and swordsmanship combined, which would have reflected credit upon much more experienced performers. There were three dramatic events, one of them from Homer, one from Shakespeare's "Hamlet," and one from "Romeo and Juliet;" and these scenes were selected in order to introduce the fence of certain special ancient arms. The fight between Hector and Achilles, first with javelins and then with shield and sword, was very graphic, and the Greek dialogue remarkably well spoken, the death of Hector and the dragging away of his body behind the chariot of Achilles being extremely well managed. The fencing scene from "Hamlet" was played with the Spanish rapier and dagger, the weapons mentioned in the text of Shakespeare, but always ignored by professional actors, and was a very attractive encounter. The scene from "Romeo and Juliet" introduced three combats, that of dagger and cloak between two pairs of younger boys representing the quarrelsome servants of the Capulets and the Montagus, the duel between Mercutio and Tybalt with the "case of rapiers," and the fight of a mixed character between Romeo, armed with rapier and dagger, against Tybalt's "two swords;" there were three other non-dramatic events, namely, a French duel, produced with the necessary accompaniment of *témoins* and a doctor, a bout of 18th century "backsword" by two rather younger boys, which was about the best bit of fencing in the entertainment, and an encounter with "sword and buckler," very prettily played by two little boys of about 13; the swordsmanship throughout, as well as the acting, was peculiarly good, and reflected the greatest credit both upon the boys and upon the masters who have taken so much pains with them.

As may be supposed, an effort of so high a class as this required

considerable practice and rehearsal, but the whole was accomplished without trenching on school work and without in any way interfering with anybody's cricket. There are those I know who are inclined to object to swordsmanship at schools, for the reason that it may interfere with the customary outdoor games; experience at Bradfield, however, shows that such an objection is unfounded. King-Pearce, the captain of the football, and, I believe, a pretty strict captain, too, was the winner of the prize foils, and Thring, who was second and who fenced so well with him in the French duel, is one of the best shots in their rifle corps; Hewetson, who fenced in the "Hamlet" and "Romeo and Juliet" scenes, has cricket colours and is in the football XI; Kitchin, who played "case of rapiers" as Tybalt, is strong in both cricket and football, and has played in both elevens. H. A. Lomas (Achilles), the senior prefect, and Sadlier and Fearon, the two "backsword" boys, are well to the front out-of-doors, and in the Junior School, G. Porter and Shea are among the best, the former having been a captain of games; there are also many others who are prominent in both kinds of athletics.

Bradfield College has clearly shown that swordsmanship, when introduced in a judicious manner, possesses great attractions for young people, and that it can exist side by side with cricket and football without the slightest prejudice to either. I ought to add that its success at Bradfield is mainly due to the encouragement given to it by the head master, which has materially assisted the efforts of those other masters who have of late devoted much of their leisure time to helping and instructing the boys.

Bradfield College has set a grand example, which we may reasonably hope to see followed in due course by other schools.

A. HUTTON.

## RESEARCHES ON MODERN EXPLOSIVES.

By WILLIAM MACNAB, F.I.C., F.C.S., and E. RISTORI, Assoc. M. Inst. C.E., F.R.A.S.

(Paper read before the Royal Society. Presented by the Authors for publication in the Journal.)

DURING the last two years we have carried out a long series of experiments with explosive compounds for the purpose of studying chemical reactions at high temperatures and pressures, and of elucidating certain thermal constants relating chiefly to the specific heat of gases under such conditions.

For these experiments we have principally used nitro-glycerin, nitro-cellulose, and several combinations of these two bodies which are used as smokeless gunpowders, for the reason that such modern explosives offer the advantage of not only presenting comparatively simple chemical reactions, owing to the absence of solid residue, but also of enabling considerable variations to be made in their composition so as to vary the proportions of the elements reacting.

We also expected that the results which we obtained would make a small contribution to the knowledge of explosives in general, following up the lines indicated by the published work of Noble and Abel, Berthelot, Saran, Vieille, and others.

In this preliminary communication we propose chiefly to indicate the results obtained in the measurement of the heat evolved by explosion, and of the quantity and composition of the gases produced by this metamorphosis.

We have also made considerable progress towards the determination of the actual temperature of explosion, and we have succeeded in recording these high temperatures by photographic means, but, as this work is not yet completed, we shall not further refer to it in this paper, but we hope it will make the subject of another communication at an early date.

These modern explosives, and especially the smokeless powders, have assumed of late such importance that it may be of general interest to give here a brief sketch of their development.

About thirty years ago experiments were made in Austria with the object of using gun-cotton for the charges of rifle ammunition, but no success was obtained, and the matter dropped.

Other explosives, consisting principally of nitro-lignin or nitro-cellulose, not gelatinised, and mixed with nitrates or other substances, were afterwards invented and adopted for sporting guns successfully, and have been largely sold in the market under different well-known names. These explosives, however, were not found suitable for the charges of rifles and guns.

Further development in the science of artillery, and a better know-  
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ledge of the action of explosives, encouraged further researches for the production of new propelling agents for rifles and guns, and these researches have been so far successful that in a few years several new powders have been produced, each one of which is far superior to black gunpowder.

The new explosives now in use contain nitro-cellulose as one of their principal elements; some of them contain also nitro-glycerin in more or less proportion; the nitro-cellulose, by solution in nitro-glycerin, acetone, or other suitable solvent, is gelatinised, and by mechanical means the explosive compound is compressed and squirted into cords, or rolled into sheets, and then cut into strips or grains of suitable size for the different firearms.

The great secret of all these modern explosives seems to be that by the above means they are made into a solid substance, thus avoiding any porosity, and it appears probable that by doing so even the most powerful explosive can be mastered, so that, burning regularly from the surface, the rate of combustion can be controlled so as to avoid detonation.

This constitutes the most striking feature of the modern smokeless gunpowders, especially of those containing nitro-glycerin. If certain sized cubes, strips or cords of such powders are fired in a certain gun, and the length of this gun does not allow of sufficient time during the travel of the shot, for the explosive to be entirely consumed, the unburnt residue of the charge will be found to be of the same shape, whether cubes, strips or cords, only reduced in size; thus proving the most perfect surface combustion of these explosives.

It is thus possible to determine accurately what quantity of explosive, and what surface of combustion for the same, will be required, in order to obtain certain results in a certain gun, thus avoiding waste of powder.

This property of modern smokeless powder was illustrated on the occasion of a disastrous fire which occurred in May, 1890, at the factory of Avigliana, Italy, where large quantities of the explosive called ballistite were manufactured for the Government. In one building twelve tons of this explosive were collected, and various operations of manufacture were performed. By accident some of it took fire, and the whole quantity was burnt in a few seconds. Though this powder was made of such powerful explosives as nitro-glycerin and nitro-cellulose, and though the amount was so large that, had it been black powder, it would have caused destruction for many miles around, still there was no explosion of any kind; none of the machinery was in any way damaged, and the wood was barely charred.

The explosives used in these experiments can be divided into three classes:—

1. Those consisting of nitro-lignin or nitro-cellulose (not gelatinised), mixed, or impregnated with a suitable nitrate, and mixed with colouring matters and some other substances for the purpose of retarding the rate of combustion. We have taken as samples of this class the EC and the SS powders now commonly used in sporting

guns (the EC consisting principally of nitro-cellulose mixed with barium nitrate and a small proportion of camphor, the SS powder consisting of nitro-lignin mixed with barium nitrate and nitro-benzene).

2. Those consisting of purified nitro-lignin or nitro-cellulose gelatinised by a suitable process, and with or without the addition of nitro-benzene or other suitable nitrates.

As sample of this class we have taken the BN powder manufactured by the French Government, and also the Rifleite and the Troisdorf powder, which are now commonly used for small arms ammunition. (The BN consists mainly of gelatinised nitro-cellulose; the Troisdorf also consists of gelatinised nitro-cellulose, but is coated with graphite. Rifleite is also made with gelatinised nitro-cellulose, with the addition, however, of a certain proportion of nitro-benzene.)

3. Those consisting of nitro-cellulose combined with nitro-glycerin, with the addition of aniline, camphor, vaseline, or other kindred substances. To this class belong cordite and ballistite.

Cordite contains 58 per cent. of nitro-glycerin, 37 per cent. of gun-cotton, and 5 per cent. of vaseline.

Ballistite of Italian manufacture contains equal parts of nitro-cellulose and nitro-glycerin, with the addition of  $\frac{1}{2}$  per cent. of aniline.

Ballistite of German manufacture contains a slightly higher percentage of nitro-cellulose, and is coated with graphite.

Besides, for the purpose of these experiments, a series of samples of ballistite were specially made containing nitro-glycerin and nitro-cellulose in various proportions.

The experiments were carried out in two closed vessels of different dimensions and construction—a large one capable of standing high pressures, and a small one for calorimetric work.

The large one consists of a steel cylinder of great thickness, closed at both ends by conical screw-plugs. One plug is provided with a crusher-gauge of the well-known pattern by which the compression of a small cylinder of copper serves to measure the pressure developed. The other plug is provided with an insulated conical core, by means of which an electric current can be passed for the purpose of firing the charge. A small hole on the side of the cylinder, bushed with iridium-platinum, and closed by a coned screw-plug, serves to control the escape of the gases produced by the explosion.

The capacity of the chamber was carefully measured, and was found to be 247.6 c.c.

The small vessel is of the same pattern as used by Berthelot, and was made by Golaz, of Paris. It has given great satisfaction, and is in excellent order, although it has been used for more than two hundred explosions.

This bomb, which is made of mild steel and is cylindrical in shape, consists essentially of three parts—a bowl, a conical lid which is accurately ground into the bowl, and a tightening cap which screws on to the bowl over the lid.

There is a small hole in the lid provided with a delivery tube, which can be opened and closed by means of a finely-threaded conical plug. There is also an insulated platinum cone inserted from underneath in the lid, which admits of the charge in the bomb being fired by a platinum wire heated to redness by electricity.

From the lid depend platinum supports which carry a platinum capsule, in which the explosive is placed and suspended in the middle of the chamber.

The capacity of this bomb is 488 c.c., and the total weight, including a small stand, when ready for immersion in the calorimeter, is 5633.28 grams.

The calorimeter is made of thin sheet brass, and a helicoidal stirrer of the same metal (Berthelot's pattern), driven by a small electromotor during the experiment, serves to thoroughly mix the water.

The calorimeter stood in the centre of an annular water-jacket covered with felt. The quantity of water used in the calorimeter each time was 2,500 grams, and the equivalent in water of the bomb, stirrer, and calorimeter, due allowance having been made for the different specific heats of the different metals, is 623.4 grams.

The different thermometers employed were specially made by Casella, capable of being read to 0.005 of a degree centigrade, and the weights of their stems, bulbs, and mercury were known.

Various experiments were made in the large vessel, especially for the purpose of determining the pressure of the gases under different densities of charge.

These trials were carried out in a field, the bomb being lowered into a hole in the ground before firing.

Various difficulties were encountered, and in one experiment considerable damage was done by the heated gases effecting their escape at the moment of explosion, and "washing away" part of the thread of one of the screw plugs.

With a density of loading of  $\Delta = 0.1$ , i.e., with a charge of 24.76 grams, the average of the pressures measured was 6.3 tons per square inch; with density  $\Delta = 0.2$  the pressure rose to 15 tons, and with  $\Delta = 0.3$  the pressure increased to 25 tons. These results are very similar to those published by Sir A. Noble, F.R.S.

With the small bomb were ascertained the amount of heat generated by the explosion, the volume and composition of the permanent gases resulting, and the quantity of aqueous vapour produced.

As most of the explosives contained no mineral matter beyond a trifling percentage of "ash," it has been possible to analyse them in this way, the products of explosion when calculated from the analysis and volume of permanent gas and aqueous vapour agreeing closely with the weight of matter in the bomb before firing.

A few of the explosives left a carbonaceous or mineral residue; but these will be specially noticed further on in connexion with the tables of the results.

The heat evolved was measured by placing the bomb containing the charge of explosive in the calorimeter containing 2,500 grams of

water, and it was arranged that the temperature of the air, the water jacket, and the calorimeter closely approximated each other. The stirrer was set in motion, and the thermometer in the calorimeter was read with a kathetometer. Observations of the temperatures were made every minute for the five minutes preceding the firing of the charge, and continued at intervals of a minute until the maximum was reached, and for five minutes longer. The correction for loss of heat due to radiation of heat during the experiments amounted in general to about 0°1 of a degree. The increase in temperature varied from about 1° to 2½° C. according to the charge and explosive used.

The gas generated by the explosion was passed through weighed drying tubes connected with the valve on the lid of the vessel, and then collected and measured in a calibrated glass cylinder over mercury. The reading of the barometer and thermometer was noted, and the volume reduced to 0° C. and 760 mm.

The water was determined by immersing the bomb in a vessel containing boiling water. A three-way glass stop-cock intervened between the valve of the bomb and the drying tubes, and the other end of the drying apparatus was connected with a water vacuum pump.

The other branch of the three-way tap was connected with a separate drying apparatus. When the water surrounding the bomb was boiling, by starting the vacuum pump the steam and water were drawn into the absorbing apparatus; after a good vacuum had been made in the bomb the three-way tap was turned so that dry air rushed in, then connexion was made with the drying apparatus, the bomb again exhausted, and so on, alternately, until (as experience showed) all the water had been removed from the bomb and collected in the drying tubes, which were then weighed. The weights of water thus obtained were calculated for comparison into volumes of H<sub>2</sub>O gas at 0° C. and 760 mm.

The analyses of gas were carried out in duplicate in Dittmar's apparatus as improved by Lennox.

In most of the experiments the bomb, previous to firing, was exhausted, and the amount of residual pressure, varying from 24 to 40 mm., noted on closing it. The amount of air corresponding to these pressures left in the bomb has the effect of increasing the heat generated by a small quantity amounting to 5 to 7 calories. This quantity being within the limits of error of the calorimetric observation no correction was made for the same, but the quantity of residual air was taken into account when comparing the weights of the products found with the weight of the explosive used. Thus in Tables I and II the volumes of gas of the given composition and of aqueous vapour were obtained from the given weight of explosive increased by the weight of the air corresponding to the vacuum indicated.

When firing in an exhausted bomb it was found necessary to have the explosive surrounding the firing wire in comparatively small pieces in order to ensure ignition of the whole charge.

TABLE I.—*Indicating the Quantity of Heat, also the Volume and Analysis of the Gas developed per gram with different Sporting and Military Smokeless Powders now in use.*

| Name of explosive.                            | Calories per gram. | Permanent gases.   | Aqueous vapour.    | Total volume of gas calculated at 0° and 760 mm. | Per cent. composition of permanent gases. |      |                   |      | Coefficient of potential energy. |
|---|--------------------|--------------------|--------------------|--|---|------|-------------------|------|----------------------------------|
|   |                    |                    |                    |  | CO <sub>2</sub> .                         | CO.  | CH <sub>4</sub> . | H.   |                                  |
| EC powder                                     | 800                | C.c. per gram. 420 | C.c. per gram. 154 | C.c. per gram. 574                               | 22.9                                      | 40.6 | 0.5               | 15.5 | 20.5                             |
| SS sporting powder                            | 799                | 584                | 150                | 734  | 18.2                                      | 45.4 | 0.7               | 20.0 | 15.7                             |
| Troisdorf, German.....                        | 913                | 700                | 195                | 895  | 18.7                                      | 47.9 | 0.8               | 17.4 | 15.2                             |
| Rifelite, English.....                        | 864                | 766                | 159                | 925  | 14.2                                      | 50.1 | 0.3               | 20.5 | 14.9                             |
| BN, French.....                               | 833                | 738                | 168                | 906  | 13.2                                      | 53.1 | 0.7               | 19.4 | 13.6                             |
| Cordite, English manufacture.....             | 1253               | 647                | 235                | 882  | 24.9                                      | 40.3 | 0.7               | 14.8 | 19.3                             |
| Ballistite, German manufacture.....           | 1291               | 591                | 231                | 822  | 33.1                                      | 35.4 | 0.5               | 10.1 | 20.9                             |
| Ballistite, Italian and Spanish manufacture.. | 1317               | 581                | 245                | 826  | 35.9                                      | 32.6 | 0.3               | 9.0  | 22.2                             |
|   |                    |                    |                    |  |   |      |                   |      | 10.6                             |
|   |                    |                    |                    |  |   |      |                   |      | 10.1                             |
|   |                    |                    |                    |  |   |      |                   |      | 10.9                             |

TABLE II.—*Indicating the Quantity of Heat, also the Volume and Analysis of the Gas developed per gram with Nitroglycerin, Nitro-cellulose, and with several different Combinations of these two Explosives made at Acheson, Parkersburg, W. Va.*

TABLE II.—Indicating the Quantity of Heat, also the Volume and Analysis of the Gas developed per gram with Nitro-glycerin, Nitro-cellulose, and with several different Combinations of these two Explosives made at Arleer-factory.

| Composition of explosive.  | Calories per gram. | Permanent gas. | Aqueous vapour. | Per cent. composition of permanent gases. |                |                   |                |                |                | Coefficient of potential energy. |
|--|--------------------|----------------|-----------------|---|----------------|-------------------|----------------|----------------|----------------|----------------------------------|
|  |                    |                |                 | CO <sub>2</sub>                           | CO.            | CH <sub>4</sub> . | O.             | H.             | N.             |                                  |
| A. Nitro-glycerin .....  | 1652               |                |                 | C.c. per gram.                            | C.c. per gram. | C.c. per gram.    | C.c. per gram. | C.c. per gram. | C.c. per gram. |                                  |
| B. Nitro-cellulose (nitrogen = 13.30 per cent.)                          | 1061               |                |                 | 257                                       | 22.3           | 45.4              | 0.5            | 4.0            | 14.9           | 1224                             |
| C. { 50 per cent. nitro-cellulose (N = 12.24 per cent.)                  | 1349               |                |                 | 203                                       | 876            | 22.3              | —              | —              | —              | 929                              |
| D. { 50 per cent. nitro-cellulose (N = 50 per cent. nitro-glycerin ..... | 1410               |                |                 | 464                                       | 817            | 36.5              | 0.2            | —              | 8.4            | 1102                             |
| E. { 50 per cent. nitro-cellulose (N = 13.3 per cent.)                   | 1410               |                |                 | 673                                       | 249            | 22.5              | 0.0            | —              | 6.0            | 1124                             |
| F. { 50 per cent. nitro-cellulose (N = 50 per cent. nitro-glycerin ..... |                    |                |                 | 13.3                                      | 247            | 41.8              | 27.5           | 0.0            | —              |                                  |
| G. { 50 per cent. nitro-cellulose (N = 35 per cent. nitro-glycerin ..... |                    |                |                 | 12.24                                     | 797            | 21.7              | 45.4           | 0.1            | —              | 1105                             |
| H. { 50 per cent. nitro-cellulose (N = 13.30 per cent.)                  |                    |                |                 | 13.30                                     | 675            | 901               | 26.6           | 40.8           | 0.1            | 1001                             |
| I. { 50 per cent. nitro-cellulose (N = 60 per cent. nitro-glycerin ..... |                    |                |                 | 13.30                                     | 637            | 227               | 864            | —              | —              | 1128                             |
| J. { 50 per cent. vaseline .....   |                    |                |                 | 60  | 1280           | 627               | 863            | 26.7           | 39.8           | 12.8                             |
| K. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | 20.2                             |
| L. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| M. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| N. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| O. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| P. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| Q. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| R. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| S. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| T. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| U. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| V. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| W. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| X. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| Y. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| Z. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| A. Nitro-glycerin .....  | 1652               |                |                 | 257                                       | 22.3           | 45.4              | 0.5            | 4.0            | 14.9           | 1224                             |
| B. Nitro-cellulose (nitrogen = 13.30 per cent.)                          | 1061               |                |                 | 203                                       | 876            | 22.3              | —              | —              | —              | 929                              |
| C. { 50 per cent. nitro-cellulose (N = 12.24 per cent.)                  | 1349               |                |                 | 464                                       | 817            | 36.5              | 0.2            | —              | 8.4            | 1102                             |
| D. { 50 per cent. nitro-cellulose (N = 50 per cent. nitro-glycerin ..... | 1410               |                |                 | 673                                       | 249            | 22.5              | 0.0            | —              | 6.0            | 1124                             |
| E. { 50 per cent. nitro-cellulose (N = 13.3 per cent.)                   | 1410               |                |                 | 13.3                                      | 247            | 41.8              | 27.5           | 0.0            | —              |                                  |
| F. { 50 per cent. nitro-cellulose (N = 50 per cent. nitro-glycerin ..... |                    |                |                 | 12.24                                     | 797            | 21.7              | 45.4           | 0.1            | —              | 1105                             |
| G. { 50 per cent. nitro-cellulose (N = 13.30 per cent.)                  |                    |                |                 | 13.30                                     | 675            | 901               | 26.6           | 40.8           | 0.1            | 1001                             |
| H. { 50 per cent. nitro-cellulose (N = 60 per cent. nitro-glycerin ..... |                    |                |                 | 60  | 1280           | 627               | 863            | 26.7           | 39.8           | 1105                             |
| I. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| J. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| K. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| L. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| M. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| N. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| O. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| P. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| Q. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| R. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| S. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| T. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| U. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| V. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| W. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| X. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| Y. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |
| Z. { 50 per cent. vaseline .....   |                    |                |                 | 5   | —              | —                 | —              | —              | —              | —                                |

Table I gives the principal results obtained with the several gunpowders above mentioned, Tables II and III give the results obtained with samples of ballistite made with different proportions of the component parts, Table IV indicates the effect of firing different weights of the same explosive in a closed vessel from which the air has *not* been exhausted, and Table V gives the original elementary composition of several explosives compared with the products of combustion, both being represented as weights.

With the exception of the results given in Table IV, all the others were obtained from the firing of 4 grams of the explosive.

In Tables I and II we have expressed the results of firing some powders now in use as well as certain specially prepared powders, so as to show the quantity of heat and the volumes and analyses of the gases produced, and have in the column headed "Coefficient of potential energy," given figures which serve as a measure of comparison of the power of the several explosives. These figures are the products of the number of calories by the volumes of gas, the last three figures being suppressed in order to simplify the results.

In the case of EC and SS a certain amount of mineral residue was left, but this was not determined.

Troisdorf leaves a slight, and Rifleite and BN a considerable, carbonaceous residue, part of it adhering so tenaciously to the bomb that an exact determination was not made.

In the other experiments recorded in Tables I and II the degree of accuracy of the results may be gauged by the fact that the average weight of the products of explosion, calculated from the results found, amounts to 99.7 per cent. of the weight of the explosive fired, the extreme limits being 100.5 and 98.9 per cent.

In Table II the comparison of the pairs of results from explosives made with lower and more highly nitrated nitro-cellulose shows that the use of the highly nitrated cellulose increases the quantity of heat developed, and diminishes the volume of gas. The composition of the permanent gases is also altered, as might be expected, there being an increase in carbonic acid and decrease in carbonic oxide and hydrogen.

The similarity in the volumes of gas produced and the composition of the permanent gases in the case of experiments F and G is worthy of note when the great difference in the original component ingredients of the explosives is borne in mind.

Table III shows clearly the increase of heat due to increased percentage of nitro-glycerin, as well as the difference of heat evolved from explosives containing nitro-cellulose of different degrees of nitration.

The diminution in quantity of heat (about 200 calories) which the replacement of 5 per cent. of nitro-cellulose by vaseline makes is also very striking.

Table IV shows the part played by the oxygen of the air in the bomb; when a smaller proportion of explosive in comparison with the air is present the combustion is more complete, and the heat evolved is greater, and the composition of the gases is correspondingly modified.

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4 " "  
5 " "  
6 " "  
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TABLE III.—*Showing the Heat developed by Explosives containing Nitro-glycerin and Nitro-cellulose in different proportions.*

| Composition of explosives.            |                 | Calories per gram. |
|---------------------------------------|-----------------|--------------------|
| Nitro-cellulose (N = 13.3 per cent.)  | Nitro-glycerin. |                    |
| 100 per cent. (dry pulp)              | 0               | 1061               |
| 100 " " (gelatinised)                 | 0               | 922                |
| 90 " "                                | 10 per cent.    | 1044               |
| 80 " "                                | 20 " "          | 1159               |
| 70 " "                                | 30 " "          | 1267               |
| 60 " "                                | 40 " "          | 1347               |
| 50 " "                                | 50 " "          | 1410               |
| 40 " "                                | 60 " "          | 1467               |
| 0 " "                                 | 100 " "         | 1652               |
| Nitro-cellulose (N = 12.24 per cent.) |                 | Nitro-glycerin.    |
| 80 per cent.                          | 20 per cent.    |                    |
| 60 " "                                | 40 " "          |                    |
| 50 " "                                | 50 " "          |                    |
| 40 " "                                | 60 " "          |                    |
| Nitro-cellulose (N = 13.3 per cent.)  |                 | Vaseline.          |
| 55 per cent.                          | 5 per cent.     |                    |
| 35 " "                                | 60 " "          | 1134               |
|                                       |                 | 1280               |

TABLE IV.—*Showing the Heat developed and the Analysis of the Permanent Gas produced in a closed Vessel from which the Air has not been exhausted—the Explosive being in every case Ballistite of Italian Manufacture.*

| Charge.      | Calories per gram. | Analysis of the permanent gas. |      |     |      |
|--------------|--------------------|--------------------------------|------|-----|------|
|              |                    | CO <sub>2</sub> .              | CO.  | H.  | N.   |
| 2 grams..... | 1587               | 37.0                           | 17.6 | 3.2 | 42.2 |
| 3 " .....    | 1485               | 36.4                           | 22.0 | 4.6 | 37.0 |
| 4 " .....    | 1446               | 36.2                           | 24.6 | 6.1 | 33.1 |
| 5 " .....    | 1415               | 36.2                           | 26.0 | 7.2 | 30.6 |
| 6 " .....    | 1380               | 36.3                           | 27.0 | 7.9 | 28.6 |

Traces of CH<sub>4</sub> were found, but in this series of experiments the quantity of this gas was not determined.

TABLE V.—*Showing the original Composition and Metamorphosis of Nitro-cellulose, Nitro-glycerin, and of several Gunpowders made by Combinations of these two Explosives.*

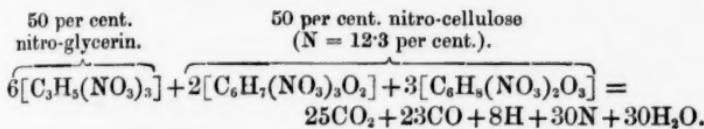
| Nature and description of explosive.                    | Per cent. composition by weight. |            |              |               | Per cent. products of combustion by weight. |                               |                            |            |              |               |                              |
|---|----------------------------------|------------|--------------|---------------|---|-------------------------------|----------------------------|------------|--------------|---------------|------------------------------|
|   | Carbon, C.                       | Oxygen, O. | Hydrogen, H. | Nitro-gen, N. | Carbonic acid, $\text{CO}_2$ :              | Carbonic oxide, $\text{CO}$ : | Marsh gas, $\text{CH}_4$ : | Oxygen, O. | Hydrogen, H. | Nitro-gen, N. | Water $\text{H}_2\text{O}$ . |
| A. Nitro-glycerin . . . . .                             | 15.7                             | 63.0       | 2.3          | 18.8          | 57.6  | —                             | —                          | 2.7        | —            | 18.8          | 20.7                         |
| B. Nitro-cellulose (nitrogen = 13.3)                    | 24.58                            | 57.68      | 2.73         | 13.6          | 29.27                                       | 0.24                          | —                          | —          | 0.86         | 13.6          | 16.30                        |
| C. { 50 per cent. nitro-cellulose (N = 12.24 per cent.) | 21.15                            | 60.67      | 2.67         | 15.58         | 41.0  | 23.1                          | 0.08                       | —          | 0.4          | 15.58         | 20.01                        |
| 50 per cent. nitro-glycerin                             |                                  |            |              |               |   |                               |                            |            |              |               |                              |
| D. { 50 per cent. nitro-cellulose (N = 13.30 per cent.) | 20.47                            | 61.23      | 2.49         | 16.35         | 45.3  | 19.0                          | 0.00                       | —          | 0.3          | 16.35         | 19.90                        |
| 50 per cent. nitro-glycerin                             |                                  |            |              |               |   |                               |                            |            |              |               |                              |
| E. { 80 per cent. nitro-cellulose (N = 12.24 per cent.) | 24.37                            | 58.98      | 2.98         | 14.0          | 28.9  | 38.4                          | 0.05                       | —          | 1.0          | 14.0          | 18.2                         |
| 20 per cent. nitro-glycerin                             |                                  |            |              |               |   |                               |                            |            |              |               |                              |
| F. { 80 per cent. nitro-cellulose (N = 13.30 per cent.) | 23.11                            | 58.98      | 2.71         | 15.84         | 33.4  | 32.6                          | 0.04                       | —          | 0.7          | 15.84         | 18.2                         |
| 20 per cent. nitro-glycerin                             |                                  |            |              |               |   |                               |                            |            |              |               |                              |
| G. { 35 per cent. nitro-cellulose (N = 13.30 per cent.) | 22.2                             | 59.0       | 2.88         | 15.46         | 33.0  | 31.3                          | 0.2                        | —          | 0.7          | 15.46         | 19.0                         |
| 5 per cent. vaseline . . . . .                          |                                  |            |              |               |   |                               |                            |            |              |               |                              |
| H. Cordite, English manufacture                         | 22.91                            | 57.72      | 2.95         | 15.19         | 31.76                                       | 32.08                         | 0.32                       | —          | 0.86         | 15.19         | 18.08                        |
| Ballistite, Italian and Spanish manufacture             | 21.47                            | 60.83      | 2.68         | 15.80         | 41.11                                       | 23.76                         | 0.12                       | —          | 0.47         | 15.8          | 19.69                        |

In Table V the elementary percentage composition of some of the explosives, along with the percentage composition of the products of explosion by weight, is given.

The composition of the samples has been calculated from the "bomb" analyses; as an example, one of the explosives and its decomposition may be represented approximately by the following equation.

We have assumed the nitro-cellulose to consist of a mixture of di- and tri-nitro-cellulose in proportion corresponding to the nitrogen as found by analysis.

The equation for Experiment C may be taken as follows:—



The composition of this explosive, calculated from the foregoing formula and found by analysis, is as follows:—

|         | Formula. | Analysis. |
|---------|----------|-----------|
| C ..... | 21.2     | 21.15     |
| O ..... | 60.8     | 60.67     |
| H ..... | 2.5      | 2.67      |
| N ..... | 15.5     | 15.58     |
|         | <hr/>    | <hr/>     |
|         | 100.0    | 100.07    |

These are some of the principal features noticeable in a preliminary survey of these experiments. We are continuing our investigations on the lines indicated in the paper, and are especially endeavouring to measure the actual temperature of explosion under varying conditions, and it is hoped that the results obtained will throw some light on the chemical and physical properties of many gases at high temperatures and under considerable pressures, and, at the same time, be useful in the practical application of explosives.

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## NAVAL AND MILITARY NOTES.

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### NAVAL.

**Home.**—The following are the principal appointments which have been made:—Captains: L. Beaumont, as Director of Naval Intelligence, vice Rear-Admiral C. A. G. Bridge; E. Poe, to "Blenheim"; R. W. Craigie, to "Camperdown"; F. W. Fisher, to "Crescent"; W. M. Lang, to "Devastation"; and A. C. Corry, to "Achilles." Commanders: H. E. Cust, to "Dart"; H. C. Kingsford, for service with Victorian Naval Forces; H. M. Tudor, to "Bellona"; J. L. Marx, to "Barrosa"; E. A. Simons, to "Melita"; R. B. Farquhar, to "Hero," in command; and R. Cumming to "Caledonia."

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The "Achilles" is to be employed in conveying new crews for the "Nile" and "Fearless," which are to recommission at Malta. The following ships have paid off: 2nd class battle-ship "Dreadnought," from Mediterranean, and the 3rd class cruisers "Garnet" from the Pacific and "Pallas" from China; the "Assistance," which for the last 20 years has been employed on trooping service in home waters, has also been paid off and will be sold out of the Service. The 3rd class cruiser "Blanche" on the Cape Station, has developed such serious defects in one of her boilers, that she has been ordered home, and has been paid off, her officers and men being transferred to her sister-ship, the "Barrosa," which not long ago took the place of the "Bellona" in the Channel Squadron; the officers and men of the "Barrosa" are now again reverting to their old ship. The first-class torpedo-gunboat "Speedwell" is also to pay off, her officers and crew being transferred to the "Sharpshooter," lately fitted with the Belleville water-tube boilers, and which will take her place in the Channel Squadron.

The new torpedo-boat destroyer "Decoy," built and engined by Messrs. John Thornycroft and Co., underwent her official trials off the Maplins, on the 21st ultimo. Six consecutive runs over the measured mile, with and against the tide, gave a mean speed of 27·641 knots. During the three consecutive hours of full-speed steaming, the mean speed attained was 27·7 knots, and the I.H.P. developed by the engines 3,900, giving three-quarters of a knot in speed, and 400 H.P. over the contract amount. The "Decoy" is a sister vessel to the "Daring."

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The first of the nine new 2nd class cruisers to be launched is the "Eclipse," and the ceremony took place successfully at Portsmouth, on the 19th July, just seven months after her first keel-plate was laid.

As a material improvement, in many respects upon the "Astrea" type, a few remarks may be made upon her construction. She is built wholly of steel, with the exception of the stern-post, rudder-frame, and ram-shaped stem, which, as is usually the case, are strong phosphor bronze castings. The framing is a combination of the bracket and transverse systems throughout the length of the double bottom, but before and abaft it, and above the protective deck, the frames are formed of "Z" bars, with intermediate angle frames worked between them above the protective deck. The double bottom extends for a length of about 152 ft., and is well subdivided into watertight compartments, but the watertight flats to magazines and shell-rooms practically extend the double bottom well towards the ends of the ship. A strongly built protective deck, whose maximum thickness is  $2\frac{1}{2}$  in., extending throughout the whole length, affords protection to the vital

parts, such as magazines, shell-rooms, and machinery, the cylinders of the latter being further protected from shell fire by a sloping Harvey-armoured coaming. The armoured deck is shaped like that of the "Vulcan," with a curve so deep as to extend down far over the sides, thus protecting a vertical streak of some 6 ft. or 7 ft. in width. The angle which this armoured deck makes with the side plating is about 45 deg., hence the 2½ in. plates with which it is covered present a horizontal thickness of 3½ in. of steel to the fire of the enemy. Thus the difference in displacement between the 5,600 tons of the "Eclipse" and the 4,360 tons of the "Astraea"—viz., 1,240 tons—is not only distributed over the longer and broader hull, but has given an extra thickness of nearly ¼ in. diagonally through the steel armour—a very important consideration indeed. The French cruisers of corresponding type have a protective deck of about 2½ in.

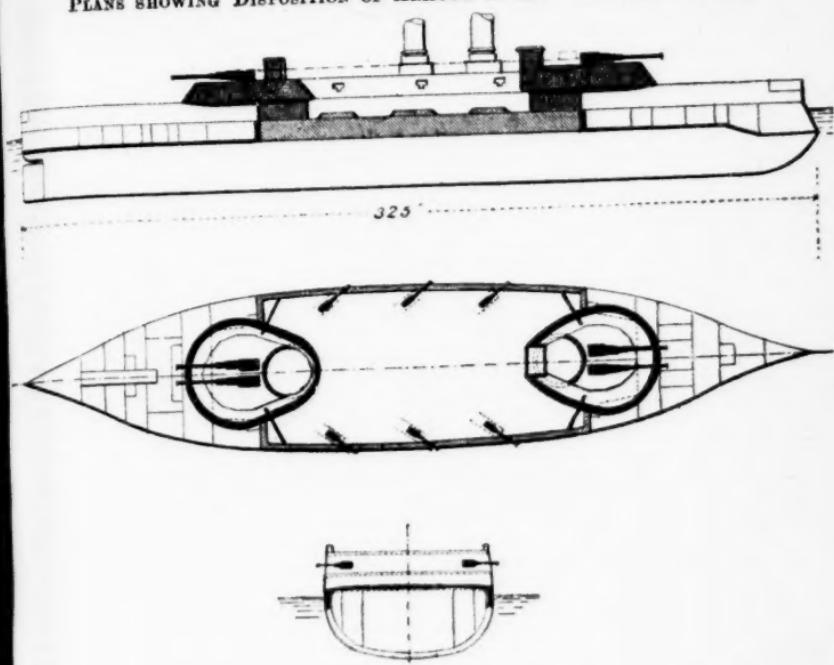
The conning tower is built of 6-in. nickel steel armour, the top plate being 1 in. thick; the upper part will be fitted with hinged covers all round for sighting purposes. The after shelter deck and forecastle will be connected by a fore-and-aft bridge. Two steel masts with wooden pole topmasts will be fitted; the question of fitting fighting top has not yet been decided.

The engines, which are under construction in the yard, will be of the triple expansion type, designed to develop 9,600 and 8,000 indicated horse-power, with and without forced draught respectively. In each of the two boiler rooms, four single-ended, cylindrical boilers will be placed, any one of which may be used independently of the other, with steam up to 155 lbs. 1,000 tons of coal can be carried.

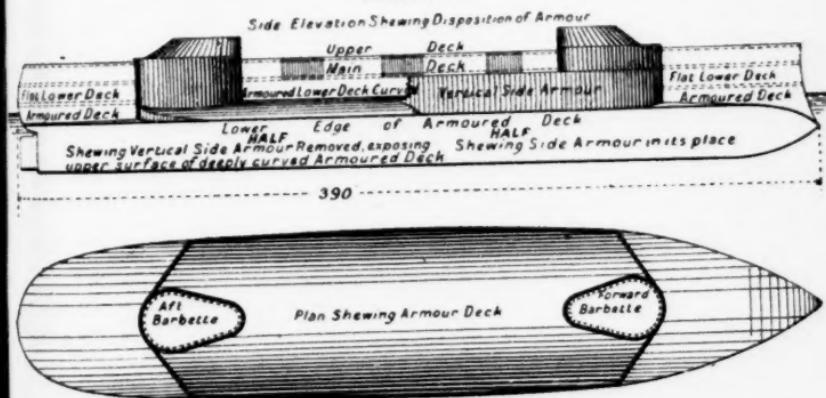
The dimensions, &c., are as follows:—Length, 350 ft. ; beam, 53 ft. 6 in. ; draught, forward, 19 ft. 6 in. ; aft, 21 ft. 6 in. ; displacement, when fully equipped, 5,600 tons. She will be sheathed with teak, and coppered. Anticipated speed, 19½ knots. The armament will consist of five 6-in. quick-firing guns, and six 4½-in. quick-firing guns, which will be carried on the upper and forecastle decks, sponson ports being constructed so as to afford a better end-on fire than is obtainable in the "Astraea" class. The minor armament will contain eight 12-pr. quick-firing guns, one 3-pr. Hotchkiss, and four 45-in. Maxim. Three torpedo-tubes will be fitted, and ten 18-in. torpedoes will be carried.

We are indebted to the courtesy of the editor of the "Engineer" for the accompanying plan (Plate 46), which shows the disposition of the armour in the new battle-ships "Magnificent" and "Majestic." It will be seen that an immense development has been effected, when the disposition of the armour is considered and compared with that on the "Admiral" class for instance, whose comparatively meagre and insufficient defence is apparent at a glance. Although in the drawing the side armour is adverted to as vertical, it is not really so, but slopes backwards to a considerable degree, as the French plan of making the ship's sides "tumble home" has been adopted to a modified extent by the Constructive Department of the Admiralty. It will be observed that the old plan of starting the armoured side streak a few feet below the surface of the water has been adhered to, the thickest portion of the steel plates reaching to the level of the flat lower deck, which rests upon the crown of the arch of the armoured lower deck. Thinner steel armour is carried up to the level of the main deck. But the most important modifications are in the armoured deck and barbettes. The armoured deck, instead of being a mere flat roof to the citadel, curves downward on each broadside to the armour-shelf or lower edge of the side armour; so that in addition to having the side armour to penetrate, a projectile would meet with 4 in. of steel set at an angle which would give a further reinforcement of about 6 in. to pass through. The height of the curve of the armoured deck is about 9 ft., and it extends unbroken from apex to apex of the citadel. The barbettes rise at either end of the citadel and are pear-shaped, passing upwards through main and upper decks, and upon their summits will be revolving armoured hoods similar to those in the "Barfleur" and "Centurion." The bulkheads of armour which enclose the ends of the citadel are in reality merely a prolongation of the side armour, which is carried round thus to meet the barbettes at the central line, and they enclose the curved slope of the armoured deck, being built against it. Another important

PLANS SHOWING DISPOSITION OF ARMOUR IN THE "ADMIRAL" CLASS.



PLANS SHOWING DISPOSITION OF ARMOUR IN "MAGNIFICENT" AND "MAJESTIC."



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feature of improvement which is observable in these ships is the greatly extended inner skin. It reaches unbroken to two bulkheads some 8 ft. or 9 ft. forward and aft of the apices of the citadel, and is thus much more effective than in ships previously designed. The unprotected ends of the two new battle-ships thus sink into insignificance. The extent of armoured surface from apex to apex of the citadel is nearly 300 ft., and it is not likely that any injury to the unprotected portion would be of so serious a character as to affect the trim or stability of these vessels to a dangerous degree.

The little experience the Admiralty have had with the torpedo-boat destroyers "Havock" and "Hornet" has shown that several alterations are required before this class of vessel can be considered a success. The six vessels of the type first ordered—"Havock," "Hornet," "Daring," "Decoy," "Lynx," and "Ferret"—have all been fitted with fixed stem torpedo-tubes. In ordinary vessels these tubes have been a great success, but before the "Havock" had been subjected to much torpedo practice it was discovered that when running at full speed she was liable to overrun a torpedo fired from the stem tube. Should this occur when the torpedo was fitted with its warhead of gun-cotton, the result to the destroyer would be disastrous. The "Havock" and "Hornet" were subsequently provided with the fastest type of torpedo in existence, but, notwithstanding that the speed of the torpedo (32 knots) was five knots greater than the boat's highest speed, the time taken by the torpedo to recover itself after being discharged from the tube was sufficiently long to enable the boat to get ahead of the weapon she had fired, and which, owing to its greater speed, would soon again overtake her. As a result of these experiments, it has been decided to abandon the idea of having the stem tubes in the remaining 36 vessels of the class, each of which will carry, instead of the tube, two 6-pr. Hotchkiss quick-firing guns. Each of the 36 improved type of destroyers will also be fitted with two single revolving broadside tubes, whereas the broadside torpedo armament of the "Havock" type consisted of a double revolving tube. It is generally understood that each of these 36 boats in course of construction is to develop a guaranteed speed of 27 knots. This, however, is not the case, as the "Charger," "Dasher," "Hasty," and "Haughty" will fulfil the conditions of contract if they attain a mean speed of 26 knots during a three hours' forced draught trial. The remaining vessels will have to attain a speed of 27 knots before they will be accepted from the contractors.

In consequence of the transfer of naval ordnance stores from the custody of the War Department to that of the Admiralty, an important organic change has lately been unobtrusively effected. Up to the present time the small arms for the supply of Her Majesty's ships and armed merchantmen have been drawn from the manufacturers at Enfield and Wedon, while the repairs have been executed at the Royal Small Arms Factory at Birmingham. This arrangement still holds good as far as the Army is concerned, but the Admiralty has ordered the stock of small arms for the naval services to be removed from Wedon and Enfield to the naval ordnance establishment at Portsmouth, which has been constituted the central dépôt for naval small arms. In future, not only the ships at the home ports, but those also at naval stations all over the world, will be supplied direct from Portsmouth, and all surplus, obsolete, and defective arms will be returned for final disposal to the dépôt, where the necessary repairs will be taken in hand. The change has caused a great increase of work, and additions have been made to the staff of armourers. At the present time the dépôt is actively engaged in providing Her Majesty's ships abroad with Lee-Metford magazine Mark II rifles, and the necessary equipment for carrying 150 rounds of cordite cartridges.

The Naval Manœuvres proper, which began on the 3rd August, came to an abrupt conclusion on the afternoon of the 5th. It is unnecessary to give any details here, the main facts being well known to every one taking an interest in the matter. Nobody will dispute, we imagine, that Admiral Dale's fleet was rightly adjudged beaten after the action on the morning of the 5th, the odds against him

were too great; unfortunately, we do not know the values attached to the different ships by the Admiralty, but if the B Fleet was really supposed to represent our Channel Squadron, composed as it now is of some of the fastest and most powerful battle-ships afloat, we can hardly believe that it could be wiped out completely, although attacked by a force considerably superior numerically. It is less easy to understand on what principle the A Fleet under Admiral Fitzroy was also adjudged completely beaten; the B Fleet of six battle-ships under Admiral Dale succumbed to the combined Blue Fleet of 11 battle-ships, but according to the decision of the umpires, in addition to B Fleet being adjudged defeated, two of the Blue Fleet battle-ships were also put *hors de combat* as the result of the first action; the Blue Fleet thus reduced to nine battle-ships, most of which must presumably have suffered some damage in the first engagement with such powerful ships as the B Fleet was composed of, proceeds to fight immediately another battle with the A Fleet numbering six battle-ships, which have not yet been in action and with crews perfectly fresh, yet in spite of these advantages, which, combined with A's superior speed, must have told most materially in his favour in a real battle, the victory is adjudged unreservedly to the B Fleet. The umpires probably had no option under the rules except to arrive at this decision, but it is a misleading decision as far as the general public are concerned, and it seems a pity that the French plan of deducting points from every ship engaged in an action is not adopted. Had the second battle between the A and the Blue Fleets been fought under the French rules, it would have been practically a drawn one, which we fancy would have come much nearer the truth than the complete defeat of A as given by our rules. Under the French regulations, when two fleets engage, standing to each other relatively in strength as three to two (which was the exact proportion of the A and Blue Fleets—six ships to nine), as the result of the action the weaker is judged to lose its strongest ship, and the other side its weakest. As one result of the Manœuvres has been to call forth from a section of the Press a cry of alarm to the effect that we stand in imminent danger of seeing our Mediterranean and Channel Fleets overwhelmed in detail by superior French forces resulting from a junction, which we could not prevent, of the Toulon and Brest Fleets, it may be as well to point out that, although at the present moment the French Active and Reserve Squadrons in the Mediterranean are, when combined, superior to our Fleet in those waters, on the other hand, on this side of the Straits of Gibraltar we are incomparably stronger. Our Channel Squadron, when strengthened, as is said to be the intention of the Admiralty, by the addition of the "Royal Oak" and "Barfleur" or "Revenge," will then consist for the first time for many years of an homogeneous squadron, formidable alike from the offensive and defensive powers of the ships themselves and from their high rate of speed, a speed which is at least 3 knots in excess of any ship in the present French Squadron of the North.

Owing to the systematic manner in which the new French battle-ships have been sent to strengthen their Mediterranean Fleet, their naval forces on this side of the Straits are for the present somewhat weak, and without a fresh distribution of their ships, they must for the next two or three years remain so. The French Channel Fleet consists of two obsolete battle-ships, their hulls being of wood, the "Suffren" and "Victorieuse," and four coast-defence ironclads, the "Fulminant," "Furieux," "Tonnerre," and "Requin;" none of these ships, with the exception perhaps of the "Requin," can steam 14 knots, while, owing to their extremely low freeboard, French officers themselves admit that the behaviour of these coast-defence ships is anything but satisfactory in a seaway. The only 1st class battle-ship at all ready for sea is the "Brennus," at Brest, which, as soon as her trials are completed, proceeds to the Mediterranean. In reserve are the "Duguayt" at Brest, and the "Turenne" and "Vauban" at Cherbourg; these three ships are practically obsolete of the class known as Cuirassés de Croisière; and the following coast-defence ships:—"Vengeur" and "Tonnant" at Cherbourg, having a speed of 11 knots; "Tempête" and "Jemmapes" at Brest. The latter is a new vessel and is undergoing her trials, and is supposed to have a speed of 17 knots; up to the present, however, she has only made 16, while the "Tempête" has only a speed of 11. There is further completing at Saint-Nazaire the "Valmy," a sister-ship of the "Jemmapes," and nearly ready for her trials, and the 1st class battle-ship

"Charles Martel," which will not, however, commence her trials before the spring of 1896; while on the stocks at Lorient is the 1st class battle-ship "Bouvet," which will not be ready before the end of 1897. This concludes the list of armoured ships, exclusive however of the five armoured cruisers "Dupuy de Lôme," "Latouche Tréville," "Charner," "Chazzy," and "Bruix," all nearly ready for sea except the latter, which will not be ready before next summer.

**Austria-Hungary.**—At the conclusion of the summer manoeuvres Rear-Admirals the Archduke Karl Stephan and Johann Hinke will take up the following appointments, the first-named as head of the Commission for completing the personnel of the fleet, and the second his former post as Military Commandant at Pola. Captain Franz Freiherr von Minutello has been appointed to the command of the Training Squadron, with the temporary rank of commodore. ("Die Reichswehr.")

On the 12th of June, there took place at Witkowitz a further very successful trial of a 10·5-in. homogeneous nickel steel plate manufactured by the Austrian firm of Witkowitz & Co., who, it may be remembered, last year secured the contract for the armour for the new Austrian ships, their plates beating those supplied by the other competing English and German firms; we shall give some details of this last trial in next month's Notes.

**Brazil.**—The United States Navy Department has just received an interesting report from Rear-Admiral Kirkland, commanding the South Atlantic Squadron, concerning the sinking of the Brazilian rebel battle-ship, the "Aiquidaban," which is now undergoing repairs at Rio. The "Aiquidaban," it will be remembered, was sunk by the torpedo-boats of the loyal squadron of Brazil. Rear-Admiral Kirkland's report is as follows:—"I have the honour to furnish the department with the following information regarding the injuries to the Brazilian cruiser '24 de Maio,' formerly the 'Aiquidaban.' The information was obtained by Ensign N. E. Irwin, of the 'Newark,' by a personal inspection. The vessel was apparently struck by a torpedo on the port bow, between the sixth and seventh frames, the injuries extending from the bow to the 12th frame and below the protective deck, which was apparently uninjured. All bilge frames, &c., on this side were crushed inward, denoting an external expansion on the port side. The watertight bulkheads at the sixth frame were entirely carried away, as were other frames aft to the watertight bulkhead at the 12th frame, which was uninjured and door closed. The two forward compartments only were flooded. On the starboard side 2 ft. above the keel, and near the seventh frame, is a hole about 2 ft. in diameter, the ragged edges of which are flanged outward and aft, showing the direction of the missile to have been broad off the port bow. This hole was presumably made by the head of the torpedo being blown completely through the ship in its original direction. The frames, longitudinals, and plating in the near vicinity of the explosion are much twisted, but the remainder of the hull is in good condition, and apparently uninjured by the explosion. When the vessel was abandoned by her crew at Santa Catherina, after the torpedo attack, they evidently attempted to disable her battery. All the guns were found to be more or less injured, except the two 70-pounders in the stern. The threads on the breech plugs of the main battery were cut, and some of the Nordenfelt guns had been thrown overboard. She is said to have made the trip from Santa Catherina with the two forward compartments full of water, and is now undergoing repairs in the Government dry dock at this place. On her arrival on May 24, her name was changed to the '24 de Maio.'"

("Army and Navy Journal.")

**France.**—The following are the principal promotions and appointments which have been made:—Capitaine de Frégate Fort to Capitaine de Vaisseau; Capitaines de Vaisseau—Delort to "Forfait," Fiessinger to command of 5th Coast Section (Saint Malo), Fort for service at Toulon. Capitaines de Frégate—Bellot to command of Défense Mobile in Algeria, Moritz to central ship of Reserve at Rochefort. De la Croix de Castries to "Davout," De Mazenod to "Mytho," Paupie to

"Adour," Dufayet de la Maisonneuve to "Fleurus," and Marin-Darbel to "Wattignies." ("Le Moniteur de la Flotte.")

It is confirmed that Vice-Admiral Gervais will be shortly relieved of his duties at the Ministry of Marine at his own request; he will be succeeded as Chief of the General Staff by Rear-Admiral Humann, lately in command of the squadron in China. Admiral Gervais is to be appointed to the command of the Reserve Squadron in the Mediterranean, in succession to Vice-Admiral De la Jaille, when the latter takes over command of the Active Division of the same fleet in the autumn. ("Le Temps.")

The armoured cruiser "Bruix," the last of the four of her class to take the water, was launched at Rochefort, in the presence of Admiral Puech, on the 9th instant. She has been built from the designs of M. Thibaudier, and bears the name of the Admiral, who was "major-general" of the squadron of Villaret-Joyeuse in 1789, and afterwards Minister of Marine. Her displacement is 4,745 tons, length 348 ft., beam 46 ft., and mean draught 19 ft. 6 in. Her machinery consists of 16 Belleville boilers in four groups, supplying two vertical, triple-expansion, four-cylinder engines, which, with modified forced draught, will develop 8,700 H.P., and give a probable speed of 19 knots. She is protected by side armour, by a turtle-back armoured deck, and by coffer-dams filled with cellulose which run right round the ship, rising 4 ft. above the water line. The end-to-end belt has a thickness of 95 mm. (3'8 in.) amidships, which is also the thickness of the turret and sponson plating, and the steel deck is 65 mm. (2'55 in.) thick, while the conning tower is also plated with 3'8-in. steel armour. The armament comprises two 19-cm. (7'48-in.) guns, one right forward in a revolving turret, and the other similarly placed aft, as well as six 14-cm. (5'51-in.) Q.F. guns in armoured sponsons on the broadsides, and four others of 65-mm. (1'85-in.), six of 47-mm. (1'45-in.), and four machine-guns, with five torpedo-tubes. The "Bruix" can, therefore, use five of her larger guns for fire ahead, as many upon either beam, and three for fire right aft, while the broadside guns have very wide firing-arcs. The turrets can be worked either by hand or electricity. The machine-guns will be disposed in the tops of her two fighting masts. The cruiser is thus, for her displacement, a very powerful fighting ship, and she is well protected against machine- and small-gun fire. ("Le Moniteur de la Flotte" and "Le Yacht.")

The battle-ship "Hoche," the flag-ship of Rear-Admiral Le Bourgeois, commanding the 2nd Division of the Active Mediterranean Fleet, is under orders to proceed to Brest, where she will be fitted with her new quick-firing armament; the ship will not be paid off, but her effective complement will be reduced to that of a ship on her trials; during her absence from the Mediterranean Admiral Le Bourgeois will hoist his flag on board the "Magenta." The battle-ship "Redoutable" has been fully commissioned at Toulon under the command of Captain Billard, and will relieve the "Amiral Duperré," which ship is to pass into the Reserve Squadron. The "Redoutable" has received new boilers and the new Q.F. armament, besides having undergone a thorough overhaul; although an old ship, having been launched in 1876, she has always been a good steamer, having formerly been able to maintain a speed of 14'8 knots, so her trials with her improved boilers are, therefore, being looked forward to with interest, as it is hoped she will now be able to make over 15 knots. She is a central battery ship of the old type, with a complete water-line belt 14 in. thick, tapering at the extremities to 10 in., and having the same thickness over her central battery; her armament consists of eight 27-cm. (10'8-in.) guns, mounted four in the battery and four in barbettes on the upper deck, one forward, one aft, and one on each broadside amidships, six 14-cm. (5'5-in.) Q.F., and 12 small Q.F. guns; she has a complement of 700 officers and men. The cuirasse-de-croisière "Turenne" is to commission at Cherbourg to take the place of the "Victorieuse," as flag-ship of Rear-Admiral Ménard, second in command of the Squadron of the North; the "Turenne" is an obsolete type of ship with a wooden hull like the "Victorieuse," but she steams 2 knots faster

than the latter, having a speed of 14 knots, and is protected by 10-in. armour, as against the 6-in. of the "Victorieuse," besides having the advantage of an armoured deck; the officers and crew of the "Victorieuse" will be turned over to her, and the ship paid off. ("Le Petit Var" and "Le Yacht.")

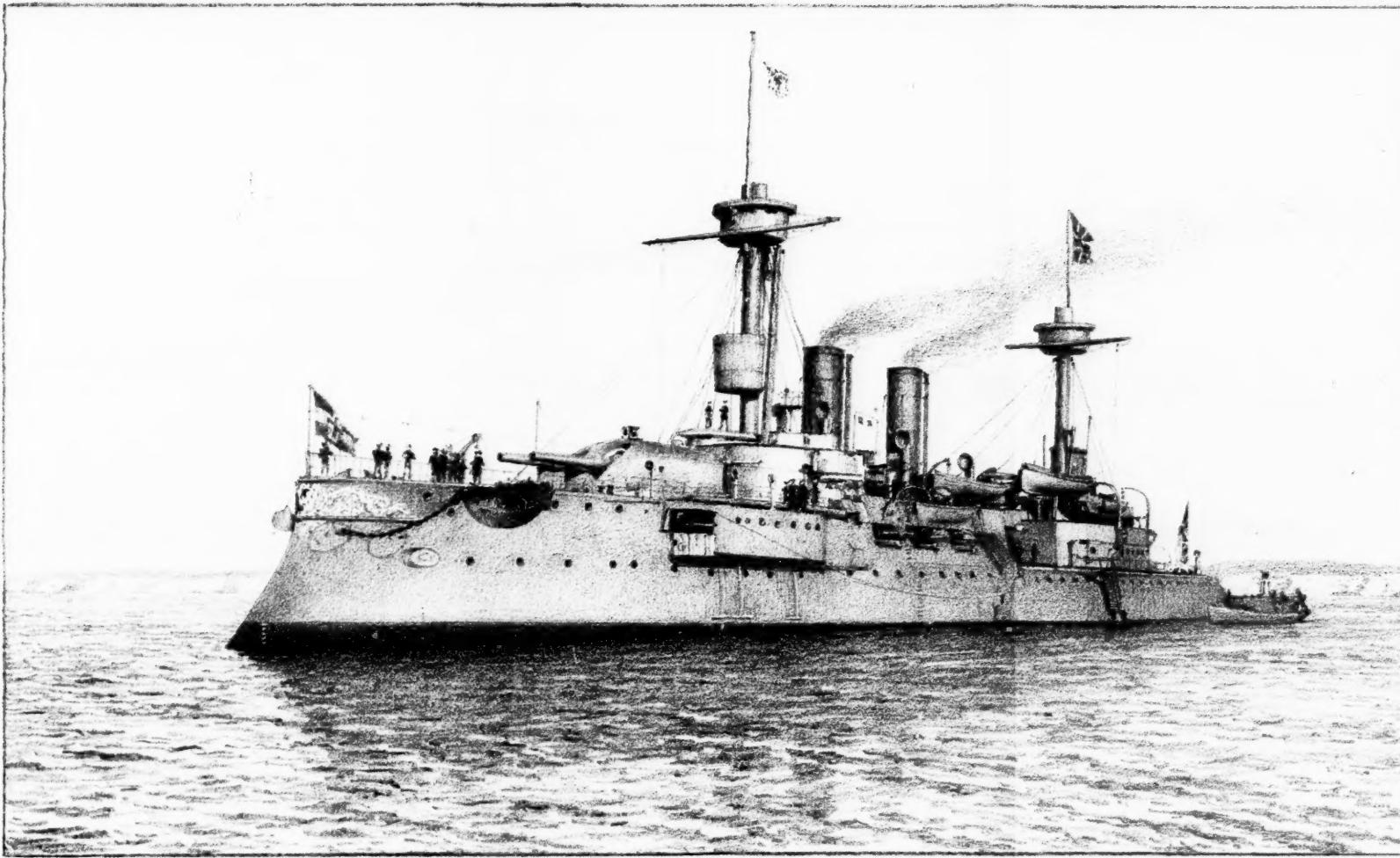
The new battle-ship "Brennus" has arrived at Brest from Lorient, and is carrying out her trials; the new coast defence battle-ship "Jemappes" has carried out satisfactorily her preliminary contractor's trials, having easily made a speed of 15·5 knots; on her official trials, which will have commenced before this, the contract speed is for 17 knots. The new torpilleur-de-haute-mer "Lansquenet," whose trials were brought to a summary close some three months ago by a serious breakdown in her machinery, has resumed them, and they are expected to be completed during the present month, when it is hoped she will attain a very high rate of speed; if everything goes off satisfactorily, the "Lansquenet" will then proceed to join the Active Division of the Mediterranean Fleet.

("Le Yacht.")

The Naval Manœuvres were carried out according to the plan of which we gave the details in last month's Notes; but they have presented no points of interest for anyone except the French themselves. In the Channel the object of the operations was to test the new organization for coast defence; the fleet bombarded Havre, Calais, and Dunkirk, but they were practically unopposed, and it is impossible to speculate as to what the effect of the bombardments would have been; the weather on the whole seems to have been bad and the sea rough, so the torpilleurs of the Défense Mobile were useless for purposes of attack, although they were employed to convey messages along the coast, and the armoured coast-defence gunboats were practically under water when they ventured out, but, had the weather been fine, it is doubtful if they could have effected anything serious against the attacking ships. The "Isly," accompanied by two torpedo-boats, landed a party of torpedo-miners, who blew up the signal station at Cape Grisnez to break the coast communication, but as far as can be learnt the signalling on shore and coast communication proved satisfactory. For the second part of the manœuvres a squadron consisting of the "Victorieuse," "Requin," "Jean-Bart," and "Surcouf," under the command of Rear-Admiral Ménard, were detailed to try and force the Straits of Dover and attack certain points on the coast between Cape Grisnez and Cherbourg, while avoiding the defending squadron, which was composed of the "Suffren," "Furieux," "Isly," "Épervier," "Lance," "Salve," and all the torpedo-boats under the command of Vice-Admiral Brown de Colstoun; the "Fulminant" and "Tonnerre" were left at Cherbourg to assist in the defence of that place, but they kept touch with the main body of the fleet by means of the semaphores and torpedo-boats acting as estafettes. On the night of the 25th-26th Admiral Ménard's ships ran through the straits with lights covered, but were soon discovered by the cruisers "Isly," "Épervier," and "Salve" of the defending force; the last two named were put out of action, as they approached too near the enemy and were kept under fire for the regulation 20 minutes. Admiral Ménard then altered course to the west, and, proceeding at full speed, endeavoured to shake off the hostile scouts, which he succeeded in doing, as about 3 P.M. they gave up the chase, apparently proceeding to report the route the attacking force seemed to be taking; he then shaped course for La Hougue, appearing before that place at 1 A.M. on the morning of the 27th, and bombarded it for five hours, according to the rules, without any sign of the defending force. At 6 A.M. he steered towards the north again, and rounding Cape Barfleur came across the "Tonnerre" and "Fulminant," sent in all haste from Cherbourg as soon as the bombardment of La Hougue was reported, with which ships he exchanged shots, but by this time the work assigned to him was complete, and he had cleverly carried out his plans. The inaction and failure of Admiral Brown de Colstoun to intercept him is not so clear, but he seems to have depended on his scouts, and they appear to have been insufficient to keep both in touch with the enemy and the Admiral at the same time thoroughly informed of the hostile movements.

The operations were finally brought to a close by a night attack on the 28th-29th on the combined squadron anchored off De Morgat by the torpedo-boats of the Défense Mobile of Brest, which was followed up by further torpedo-boat attacks on the squadron the following day when *en route* for Cherbourg. In the Mediterranean, although, in consequence of the absence of Rear-Admiral Le Bourgeois's division on the coast of Africa, no manœuvres on a grand scale were carried out, yet for a period of four weeks the remainder of the active and reserve squadrons were engaged in a series of minor tactics, scouting, and transmitting intelligence, which probably have been as valuable, or more so, than manœuvres on a large scale brought to a premature close in 36 hours, as has lately been the case in England. Not counting the attacks on various points of the coast, the landing of parties to destroy semaphores and cut the coast communications, torpedo-boat attacks, &c., an interesting series of operations was carried out in scouting under various conditions by cruisers, to which subject much attention has been devoted by the French naval authorities during the manœuvres of the last three or four years. In the first theme a squadron under Admiral Prouhet was dispatched to the southward, afterwards being directed to alter course, which he did to the westward. Some hours later a cruiser division under the command of the "Alger" was sent in quest of him, the vessels proceeding upon various curves; 15 hours later the "Wattignies" gained touch with him. In the second case, the scouting division had to maintain touch with the enemy, while at the same time transmitting intelligence of his movements to headquarters. Admiral Prouhet's division again took the part of the enemy, and the "Wattignies," which had carried off the honours on the previous occasion, was directed to again keep contact with him and signal all his movements. Admiral Prouhet would have succeeded in baffling the vigilance of the "Wattignies," as his cruisers grouped *en masse* turned their search-lights full upon her, and kept her under them with such effect that those on the look-out were blinded and the vessel was helpless; in the meantime the Admiral with his battleships altered his course and made off at full speed, and would, undoubtedly, have escaped but that the torpilleurs with the "Wattignies" made a diversion by attacking the cruisers, obliging them to use their search-lights in their own defence; the "Wattignies" was thus enabled to detect the change of course made by the enemy, signalling it to the "Alger," which in turn conveyed the intelligence to Admiral Gadaud in the "Dévastation" some 50 miles away. Admiral Gadaud with his squadron was next employed to blockade another in a bay and to try and prevent the blockade being raised; this he was not able to do, although his scouts warned him of the approach of the second hostile squadron in time to prevent his being overwhelmed himself. In the action which took place the torpilleur-de-haute-mer "Mousquetaire" ran into the "Audacieux," a similar vessel, while going at 17 knots speed, but fortunately struck at such an angle that the "Audacieux" was not sunk. At the conclusion of the operations the active and reserve squadrons returned to Toulon, where before the reservists were disembarked a grand review was held on shore by Vice-Admirals Boissoudy and De La Jaille of the landing corps from the two fleets, 3,400 men from the active squadron, and 2,400 from the reserve were landed and marched past their respective Admirals. ("Le Moniteur de la Flotte" and "Petit Var.")

**Germany.**—The following are the principal appointments which have been made and will take effect at the conclusion of the manœuvres:—Captains—H.R.H. Prince Henry of Prussia, to "Wörth;" Boeters, to "Kurfürst Friedrich Wilhelm;" Büchsel, to "Weissenburg;" Geissler, to "Brandenburg;" Fritze, as Chief of the Staff of the Naval Station of the Baltic; Rittmeyer, to "Sachsen;" Galster (Max), to "Baden." Corvette-Captains—Thiele (August), to "Blücher;" Borckenhagen, to "Prinzess Wilhelm;" Oelrichs, to command of the central ship of the Reserve Division of the 4th class battle-ships at Wilhelmshaven; Sarnow, to "Areona;" von Halfern, to "Carola;" and Rosendahl, to command of the central ship of the Reserve Division of the 4th class battle-ships at Kiel. ("Marine-Verordnungsblatt.")



THE NEW GERMAN BATTLESHIP "WÖRTH," 10,040 TONS, 10,200 I.H.P.

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The new 1st class battle-ship "Wörth" (Plate 47), which is flying the flag of Admiral Baron von der Golz, the Commanding Admiral of the German Navy during the manœuvres, has lately completed her trials most satisfactorily. She is one of a class of four ships peculiar to the German Navy, as they have three turrets, in each of which two heavy guns are mounted, instead of the two turrets, or barbettes, in which the heavy armament of modern battle-ships is usually carried; the other three sister-ships are the "Brandenburg," which also forms part of the manœuvre fleet, and the "Weissenburg" and "Kurfürst Friedrich Wilhelm," both of which are approaching completion. Their dimensions are as follows: length, 354 ft. 4 in., beam, 64 ft., and with a displacement of about 10,000 tons, they have a mean draught of water of 24 ft. 7 in.; the engines are to develop 9,000 I.H.P., and to give a speed under forced draught of 16 knots. The armour protection consists of an all-round water-line belt of nickel steel, 16 in. thick, but tapering at the bow and stern to 12 in.; the turrets are also protected with 12-in. armour, while the armoured deck is 28 in. thick. The armament consists of six 28-cm. (11.2-in.) guns, six 10.5-cm. (4.1-in.) and eight 8.8-cm. (3.5-in.) Q.F. guns, and 10 machine guns. The six 28-cm. guns are mounted in three barbette-turrets with steel hoods, the foremost of which permits the guns to be fired over the forecastle, from right ahead to about 45° abaft the beam; of the two after barbettes, the one on the quarter-deck has an arc of training fore and aft of about 90°, while the after one has an arc from right astern to about 45° before the beam; the six 10.5-cm. Q.F. guns are mounted in a central battery abaft the foremost barbette; the two foremost 8.8-cm. guns are in armoured sponsons forward, two others are also mounted in afterpart of superstructure forward, while the remaining four are mounted in the superstructure aft and have an arc of training from right astern to well before the beam; there are also six above-water torpedo-discharges. The trials of the "Wörth" began in November of last year, and were brought to a conclusion last May; in a moderate sea, which the ship experienced between Christianöe and Rixhöft with the force of the wind 8, she rolled 15° both ways, once or twice going over to 20°; the pitching was slight and easy. The ship answers her helm readily, although her displacement is heavy. She was, when steaming 15 knots, brought to a dead stop in two minutes with both engines going full speed astern. The highest speed attained by the "Wörth" was 17.2 knots with 111 revolutions of the screws off Bornholm, where there was 30 fathoms of water; with the same number of revolutions in the Eckernförder Bay she made 16.9 knots, and in the bay of Danzig, where there was only 20 fathoms water, the speed was only 16.5 knots. The least number of revolutions of the engines was 18, which gave a speed of three knots; there was at no time, even when going full speed, any appreciable vibration. From the beginning to the end of the trials there does not seem to have been the slightest hitch, and how satisfactory the trials proved is shown from the fact that although the contract I.H.P. was only 9,000 H.P., with an estimated speed of 15.5 to 16 knots, yet the H.P. actually developed was 10,228 with a corresponding speed of 17.2 knots. The accommodation for officers and men, of which her complement is 552, is also very good, and the ventilation excellent. ("Marine Rundschau.")

Rear-Admiral H.I.H. Prince Karl Stephan of Austria will be the guest of the Emperor on board the "Hohenzollern" during the latter part of the Manœuvres. ("Kieler Zeitung.")

The following officers have been appointed to ships to do duty as Umpires during the Manœuvres: Vice-Admiral Valois to "Baden," Rear-Admiral Hoffman to "König-Wilhelm," Rear-Admiral von Reiche to "Stein," and Captain Galster (Karl) to "Hildebrand;" as Assistant-Umpires, Captains—Graf von Baudissin to "Baden," Von Eickstedt to "Württemberg," Dittmar to "Moltke;" Corvette-captains—Schneider to "Gneisenau," Flachte to "Frithjof," and Borckenhagen to "Prinzess-Wilhelm;" for torpedo-boats, Corvette-captains Thiele, Oberheimer, Darmer, Köllner, and Krieg; Captain-lieutenants Rollmann, Schäfer, and Schaumann. ("Kreuz Zeitung.")

**Italy.**—Admiral Morin, the Minister of Marine, has been visiting the principal naval centres, Maddalena, Spezia, Venice, Naples, and Tarento, in order to study for himself, on the spot, the results, technical and administrative, which have been brought about by the numerous and radical reforms lately introduced into his department, and also to see if any other measures can be taken for making the organization more economical without affecting efficiency.

The Admiral has never given it as his opinion, as has been stated, that the fortifications at Maddalena and in Sardinia are useless; he has merely expressed a conviction that some of the works provided for in the plans of defence cannot be considered as indispensable, and that the money allotted would be better spent in strengthening the fleet. However that may be, the Minister is taking steps to hasten on the completion of the defensive works at Maddalena and in Sardinia, and he proposes to allot to those two points the largest part of the sums voted in the Budget for the defence of the coasts. Tarento, which is destined to become the headquarters of the 2nd Maritime Department in place of Naples, is also to have considerable sums devoted to it. ("L'Italia Militare e Marina.")

The new battle-ship "Sardegna," whose forced-draught trials came to a premature close on the 16th May last, in consequence of the breakdown of one of her ventilating engines, resumed them on the 10th of July, and completed them satisfactorily; there was a slight sea on and light breeze at the time, while the mean draught of the ship was 27 ft. 6 in., with a displacement of 13,505 tons. The engines developed 16,220 I.H.P., the mean during the run being about 15,000, while the highest speed obtained was 20·2 knots, with a mean of 19·6 knots. The I.H.P. was not as great as on the previous trials, when 17,500 H.P. was at one time developed, and falls considerably short of what the engines were expected to develop, but the mean speed was faster by half a knot than at the last trial, as also was the maximum of 20·2, which, under the circumstances, must be considered a splendid performance for a ship of that size, and speaks well for her design and for the machinery. The new armoured cruiser "Marco Polo" has been also undergoing her trials since the 2nd July, but full details are not yet available. ("Rivista Marittima.")

The method of making fuel bricks of crude petroleum adopted by Engineer Maestracci, of the Italian Navy, is as follows: The bricks are of similar form and size to the coal briquettes extensively used in France and Germany. The mixture is made in the proportion of 1 litre of petroleum, 10 per cent. of resin, 150 grams of powdered soap, and 333 grams of caustic soda. The mixture is heated and stirred at the same time; solidification begins in about 10 minutes, and the operation must then be carefully watched. If there is a tendency to remain liquid, a little more soda is added. The mixture is stirred until the mass becomes nearly solid. The thick paste is then poured into the moulds, which are placed for 10 or 15 minutes in a drying stove. The briquettes are then cooled and are ready for use in a few hours.

Signor Maestracci recommends the addition of 20 per cent. of wood sawdust and 20 per cent. of clay or sand, which will make the briquettes cheaper and more solid. In trials made at Marseilles on several tugboats the petroleum briquettes furnished about three times as much heat as coal briquettes of the same size. They were burned in the ordinary boiler furnace without any special preparation, and gave out very little smoke, leaving also little or no ash. The advantages claimed for the petroleum briquettes for marine use are the absence of smoke and a large reduction in bulk of fuel which must be carried as compared with coal, while the risks attending the carrying of liquid fuel are avoided. ("Revue Scientifique.")

**United States.**—The "Minneapolis," the second of the two so-called "Commerce-Destroyers," underwent her official trial on the course between Cape Ann and Cape Porpoise, Mass., July 14, making the distance of 89·94 miles in three hours and 49 minutes, or at an average of 23·05 knots an hour. This high rate of

speed, it is also stated, has earned for her builders, the Messrs. Cramp, a premium of \$414,600 for excess over the contract speed of 21 knots. The day was favourable for the trial, with a smooth sea. The "Minneapolis" was down to her registered displacement of 7,350 tons, and drew 22·7 feet forward, 23·4 feet aft, and a mean draught of 22 feet 8½ inches, within 2½ inches of her required depth. All movable fittings on the decks that would be likely to catch the wind were stowed away. As the vessel crossed the line at the start her engines were credited with making 133 revolutions, and her boilers with 150 lbs. of steam. The elapsed time over the first half of the course was 1 hour 55 mins. 18 secs., an average speed of 22·9 knots; the tide and what little wind there was were against the cruiser. The elapsed time over the second half of the course was 1 h. 53 mins. 42 secs., while the average speed was 23·20 knots. For the whole course the average was 23·05. The average revolutions of her screws are given as 138 per minute, and the horsepower something over 21,000. There was little vibration for so high a rate of speed. No stop was made to cool bearings, and the working of the machinery is reported as perfect. We gave full details of the ship in last December's Notes, but we may record again her principal dimensions:—Length, 412 ft.; beam, 58 ft., and with a displacement of 7,350 tons, has a mean draught of 22 ft. 6 in.; although nominally a sister-ship of the "Columbia," she is really slightly larger, her grate area is one-seventh larger than that of the "Columbia," and she can also carry more coal; her bunkers hold 2,000 tons, and at 10 knots the vessel can steam 11,000 miles; she is driven by triple screws, and has three sets of triple expansion engines. ("Army and Navy Journal.")

According to the official report, however, at the time of the trial the "Minneapolis" was light, having no armament, equipment, or stores on board, and only a portion of the coal, so the speed obtained (23 knots) is, under the circumstances, really no criterion of what the ship's after performances may be. "Scientific American" again calls attention to the unsatisfactory nature of these trials, and calls upon the Government to commission either her or the "Columbia" in the ordinary way, and send them then to make the run across the Atlantic, and it will then be possible to see what chances they have, if any, of catching any of the large Atlantic liners. Not the cleverest mathematician can determine from a four hours' run of a stripped ship what the same vessel would do with her guns, boats, and deck equipment in place, and with 10 days' coal on board, over the ocean course.

The two new gunboats "Castine" and "Machias," which, when completed for sea, were found to be wanting in stability, are now in the Brooklyn Navy Yard, where they have been cut in two amidships, and lengthened 14 ft.; their displacement will thus be increased from 1,050 tons to 1,220 tons, and their length from 190 ft. to 204 ft., while the metacentric height is increased from 9 in. to 19 in., thus adding greatly to their stability, and giving them, moreover, increased bunker room, which will enable them to carry 85 additional tons of coal on the same draught, and will increase their radius of action by about 750 miles, burning 14 tons of coal a day. It has also been decided to substitute 5-in. Q.F. guns for the 6-in. Q.F. guns now carried by the new 2nd class cruisers "Detroit," "Montgomery," and "Marblehead," in consequence of the want of stability these ships have also displayed. ("Scientific American.")

The official report of the trial of the largest plate which has ever stood the ballistic specifications of the Naval Ordnance Department was made June 16, and was promptly approved by the authorities. 600 tons of armour are accepted under this trial. The report is as follows:—

"Massachusetts," 17-in. barbette curved Harveyized nickel-steel plate, made by Bethlehem Iron Company. Plate backed, as usual, with 36-in. oak backing, and 24 3½-in. armour bolts. Distance from plate to gun 385 ft. Line of fire normal to centre of plate. Gun used, 12-in. breech-loading rifle, No. 8, on Puritan's hydraulic gun mount No. 4. Round 1.—Charge 253 lbs. powder; striking velocity, 1,410 ft. per second; striking energy, 11,729 ft.-tons, or 388 ft.-tons per ton of plate. Projectile, 12-in. Carpenter shell, weighing 850 lbs., hardened 2 in. below barrel, and of

normal dimensions. Struck plate 60 in. from left edge, 48 in. from bottom and nearly normally, angle of impact being less than one degree. Shell broke up, most of the ogival remaining in impact; core out 2½ in. from the face of plate. A portion of this shell was shaken out by second impact, when the penetration was found to be something over 6·3 in. Diameter of splash on plate 20 in. A slight bulge was raised on the plate with a few short radial cracks in it. Plate uncracked; structure sound; heaviest piece of shell recovered 26 lbs. Round 2.—Charge, 396 lbs. powder; striking velocity, 1,858 ft. per second; striking energy, 20,367 ft.-tons, or 673 tons per ton of plate. Carpenter projectile, same as in last round. Struck plate 42 in. from right edge, 41 in. from former impact; line of fire nearly normal. Projectile broke up, ogival and part of body welded into plate, bottom of core of shell 2 in. inside face of plate, giving an estimated penetration of about 15 in. Splash on plate from 18 to 20 in. in diameter, metal chipping off somewhat about edges. Slight bulge on radial cracks, similar to first impact. A through crack about  $\frac{1}{16}$  in. wide was opened out from this impact, running a little downward to right edge of plate. A small piece of metal just below impact was chipped off. One armour bolt under the impact was broken and driven 2 in. to the rear. Plate and backing went back 2 in., and returned 1 in., and was set over about 2 in. to right. Heaviest piece of shell recovered was base and part of body weighing 132 lbs. As this plate has come up to the requirements of the specifications ballistically, we have to recommend the acceptance of group 16, which this plate represents."

A second representative plate of a group of 18-in. Harveyized armour, manufactured by the Bethlehem Company for the side of the "Indiana," was tested July 23 at the Indian Head Proving Grounds. Much to the satisfaction of the ordnance experts, the plate passed the test, and the group was accepted. The plate was 16 ft.  $\frac{1}{2}$  in. in length, and its thickness at the top was 18 in. The width on the part 18 in. thick was 4 ft. 1 in., and on the tapering part 3 ft. 5 in. The plate was secured to a solid oak backing 37½ in. thick, increasing to 47½ in. at the bottom, to conform to bevel of plate, by 26 armour bolts 3½ in. in diameter, and held in against target structure by 11 tie-bolts 1 5-10 in. in diameter. The plate was 387 ft. distant from the 12-in. gun used. The official reports give the rounds as follows:—

Round 1.—Charge, 249½ lbs.; striking velocity, 1,465 f.s.; striking energy, 12,660 ft.-tons, or 370 tons per ton of plate; ratio of energy to that necessary to just perforate wrought iron of same thickness, 1·06. Carpenter A. P., projectile, 255, lot 5, of normal weight and dimensions, hardened 4 in. below bourrelet, struck plate practically normally, 54 in. from right edge and 55 in. from bottom, and broke up, point and ogival welding into impact, and other pieces flying to considerable distances; one piece of body weighing 27 lbs. going to the rear about 400 ft. and falling on platform alongside of gun, striking the saddle strap of 10-in. gun. A bulge 34 in. diameter and from  $\frac{1}{2}$  to  $\frac{1}{2}$ -in. high was raised about impact; the part nearest to edges of plate chipping off to diameter of 18 in. The bulge, the fragments of shell in impact, and broken pieces of shell metal were very warm. The portions of shell welded into impact were cracked and set up considerably. Apex of core out from face of plate 3 3-10 in., giving an estimated penetration of about 11 in. A number of radial cracks from 4 to 6 in. long and 2 to 3 in. apart were opened out in the bulge. Left edge of backing set out  $\frac{1}{2}$  in.; right edge springing back 2 in. and setting out again  $\frac{1}{2}$  in. from original position. One armour bolt broken and driven 18 in. to the rear. One tie rod broken. There were no cracks in plate.

Round 2.—Charge, 397·5; striking velocity, 1,926 f.s.; striking energy, 21,882 ft.-tons, or 640 ft.-tons per ton of plate; ratio of energy to that necessary to just perforate wrought iron of same thickness, 1·84. Carpenter A. P., shell, 127, lot 4, of normal weight and dimensions, hardened 4½ in. below bourrelet, struck plate normally, 103 in. from right edge, 49 in. from impact No. 1, 16½ in. above bevel line, and broke up; forward part of shell as far as bourrelet remaining in impact. Lower part of body and base swelled to diameter of about 17 in., rebounding about 5 ft. to the front; other pieces scattered to various distances. The splash of impact was 26 in. horizontally, and 22 in. vertically. The plate was divided into two pieces by an irregular crack from top to bottom through impact, the two pieces being wedged apart by the force of the blow, the surface of the interior of hole

welding into the surface of shell, and shrinking away from the rest of the plate. Part of the surface of interior near mouth showed signs of fused metals. Shell and impact close to edges very warm; bulge not so pronounced as in former impact, being highest on upper edge, where it was 4-10 in. The plate about impact was hot to the hand to diameter of 30 or 32 in. Hole in face of plate, 17 in. in diameter. The crack opened out in plate was  $\frac{1}{2}$ -in. wide at bottom and  $\frac{1}{4}$ -in. at top. Lower edge of plate sprung out from backing  $\frac{1}{2}$ -in. Plate dished slightly about impact. Penetration about 17 in. Back bulge probably broken. Shell turned a little to the right in penetrating.

"As this plate has come up to the requirements of the specifications," the report concludes, "we have to recommend the acceptance of Group 14, Bethlehem Iron Company, which it represents." ("Army and Navy Journal.")

## MILITARY.

**Home.**—The following notes on the tactical training and organization of massed batteries of horse and field artillery have been contributed by Lieut.-General Sir William Williams, K.C.B., R.A.

**Organization.**—A brigade of artillery consists of two or more brigade-divisions. A brigade-division consists of two or three batteries. An officer can command and lead three batteries of field artillery. The smallness of the whole number of batteries, owing to the expense, the mobility required when manoeuvring with cavalry, and the difficulty of commanding and leading on account of the pace, recommend there being only two batteries in a horse artillery brigade-division. There ought to be two kinds of horse artillery; one with the armament of field artillery to be attached to infantry, and the other with a lighter armament to be attached to cavalry, and for India.

Whether or not it would be better that all artillery should be divisional is a question of artillery and also of army organization. Formerly a reserve artillery was held in reserve. Now, all guns are placed in position at once, or put into action as soon as they can come to the front, and it would be in the natural order of things to make all artillery divisional. It may be said that taking away corps artillery shortens the divisional column of route, but there is more value in the argument that giving all the artillery to the divisions would place the artillery better under command. Our organization of three divisions in a corps favours making all artillery divisional.

The frontage of artillery in action being a fixed quantity, the proper number of guns in a corps depends upon the frontage of the infantry, and upon whether or not it is meant to fight an artillery battle along the whole line. If all artillery should be made divisional, and we should add one battery of horse artillery and one of field to the corps—not counting the artillery with cavalry—we should have 96 guns, and there would be a brigade-division of horse artillery and one of field with each of the first and second divisions, and two field brigade-divisions with the third division. The Continental strength of artillery has passed the proper limit. We might safely make our limit 114 guns, not counting artillery with cavalry. Extravagant increase of the proportion of artillery can only prolong the line of battle and put off the time when the infantry shall fight.

The brigade-division of artillery is a tactical unit. The majors command their batteries at home and command and lead them in the field, and commanding officers ought to let the majors command their batteries at home; the commanding officer commands the brigade-division at all times, and leads it in the field. We have single battery stations, and at some places where there are two batteries there is only a bit of field for a drill-ground; but the commanding officer must keep to the idea that his brigade-division is a tactical unit. The duty of the commanding officer would come more easily to him if he should always command the same batteries; but, as the high efficiency of our horse and field artillery is mainly due

to our letting majors command their batteries, it is not advisable to risk our pre-eminence by making regiments of one or more brigade-divisions.

*Drill and Manœuvre.*—Manœuvring a brigade of artillery is the particular duty of a General officer. As a brigade of artillery going into action will be led by its brigade-division commanders, it is sufficient to determine the tactical drill of a brigade-division. The rendezvous formation of artillery is quarter column of batteries; the battle formations are line and échelon of lines.

A line is led by the commanding officer, who rides in front of the centre, so that by turning in his saddle he can see his line, and wave up either flank or hold it back. A commanding officer ought to be able to lead his line at a gallop, square into a marked position of little more than his proper frontage. The officer commanding the centre battery, or when there are only two batteries the adjutant in line with the majors, follows the commanding officer. The advance may be steered by a base a horse's length in front of the flanks of the centre battery, or in front of the two centre subdivisions of a line of two batteries; but the base is given only to teach the line to look to the centre guide, and artillery must be drilled to advance without markers. On rough ground flank batteries may take quarter-column distance in short échelon to the rear. If, in order not to waste frontage nor to shut out guns—or not to mask other troops nor to move too wide of them—it should be advisable to name a flank battery to direct, the advance would be made in short échelon, and the commanding officer would lead the inner battery. A line may not take ground nor incline; batteries may be wheeled into oblique échelon. Horse artillery in line ought to be practised in advancing to the right or left front, regaining their proper front, and bringing their outer flank forward to come into action—that being the normal manœuvre of artillery with cavalry.

Quarter column of batteries, line of columns, and mass are the proper rendezvous formations. Line of battery quarter columns at battery interval is an unprofitable adaptation of line of squadron columns at close interval. At cavalry manœuvres, in preliminary formation, the artillery in battery columns have marched in rear of the first line, so that the guns were ready to pass to the front through the intervals; but, as artillery ought never to be directly in front nor directly in rear of cavalry in line or in line of squadron columns, the use made of battery columns was wrong. As three batteries can form line to the front more easily and more correctly from quarter column than from line of battery quarter columns—as artillery can advance more easily and correctly in line than in line of battery columns at deploying interval—and as the drill of battery columns is unsymmetrical, complicated, and not applicable to the movement of a brigade—line of battery columns is not a good formation. Line of battery columns is applicable only to a brigade-division of two batteries acting apart from other artillery. Three batteries in quarter column advancing at a trot form line to the front by the gallop of the rear batteries, the battery second in column wheeling subdivisions half right and the rear battery subdivisions half left to clear their front and get their interval; if line is to be formed "on the right" or "on the left," the order so to form must be expressly given. The rear of two batteries in quarter column comes up on the right, unless "on the left" is expressly ordered. Field artillery must be drilled to form line to the front by the gallop of rear formations. It is not necessary to wheel subdivisions first square to a flank and then half left or half right: they can wheel half right or half left and gallop from their place in quarter column.

The normal drill of artillery attack is to move in quarter column so as to get a clear front or a direct line of advance to form line to the front, and to take the line square into a marked position; the ground must be widely practicable for wheels, a battery may advance in column to clear an obstacle, and the enemy to be fired at are supposed to be opposite to the marked position. The manœuvre is that by which artillery would go into action across the open under fire. If there is hill and dale or wood or water on the ground where troops may exercise, a brigade-division must be practised in going into action in cramped places and in positions to which the advance cannot be made, or ought not to be made, in line. On such ground reconnaissance ought to be practised, and sending out flank and

search patrols and ground scouts, with the understanding that in presence of the enemy reconnaissance may be inadvisable, and that ground scouts ought not to be used without necessity.

In default of drill over a country, much may be done on the drill-ground; much may be learned and taught by finding artillery positions in the neighbourhood and planning how to get a brigade-division into action there; and much may be learned, with neither ground nor batteries before the eyes, by applying drill to tactics on a map, or in the mind. On a drill-ground, the line on which the batteries are to come into action and the position of the enemy can be flagged; the bandrols showing the enemy need not be far from the position marked for the guns. By placing one line of bandrols aslant with the other, and cautioning the majors to come into action "batteries right forward" or "left forward," the manœuvre may be practised of going into action, when, the ground not allowing the whole line to be at right angles nor sufficiently nearly at right angles to the line of fire, the batteries must be in short échelon. Supposed obstacles may be flagged. It is easy to practise the manœuvre of passing along behind a ridge and going into action on the crest or down the other slope. The manœuvre of forming line, or short échelon of batteries to the right on the left of the leading battery, or to the left on the right of the leading battery, ought to be practised. Forming line on the new alignment, when the head of a column has changed direction, is also a manœuvre applicable to artillery not exposed to fire.

Tactical drill ought to be taught everywhere and often, but it ought to be remembered that tactical drill is for the officers only, and especially for the commanding officer and the battery commanders. The batteries cannot manœuvre well unless they move well, and they cannot move well unless they are constantly drilled in the strict school of parade movements, and movements more like parade than like war. Drill, up to the moment when the trails shall touch the ground, may make the difference whether a battery will get into action or not; and it will certainly be easier to place a great force of artillery in action if the batteries shall have been drilled in brigade or in brigade-division.

**Gunnery.**—We are learning gunnery practically now; we are aware of the importance of officers and men being really gunners, and there is no danger of our relapsing into the old state of carelessness.

In the fighting of artillery against artillery, power at long range is of more value than power at medium or at short range; and, in the fighting of artillery against infantry or cavalry, power at short range is the most valuable. Our gun, as we use it, is a good gun at long range. It is a question worthy of consideration, whether we are right to trust to maintaining in ourselves that equal mind, and in our men that intelligent and active obedience, which shall enable us to fire time shrapnel in battle nearly as well as we fire it at home; or whether it would be better for us to have a good percussion shell. We want a light gun for horse artillery. We ought not to make all horse artillery light, and none light enough; we ought to have horse artillery with the armament of field artillery to fight in the line, and other batteries light enough to take part in cavalry manœuvre and battle. The gun for horse artillery with cavalry ought not to weigh more than 24 cwt.; the wagon, marching with the squadron carts, need not be quite so light.

In the conflict of artillery with artillery, the sum of discipline and gunnery and armament on one side and the other not being too unequal, the artillery which shall concentrate its fire will prevail over the artillery which shall continue to fight by batteries. The advantage of concentration on the one side will be much more than the advantage of not being fired at on the other, if the concentration shall not begin too soon, and shall pass from battery to battery of the enemy in proper time. As well might two forces of all arms fight equally all along the line, without attempt on either side to gain advantage by collecting strength, as artillery fight by batteries against artillery. It will always rest with the senior officer to order concentration; but the order of the regiment ought to be to fight by brigade-divisions against batteries in succession.

It ought to be ordered—and, until the regiment shall become accustomed to it, care ought to be taken to insure the carrying out of the order—that on every occasion of coming into action at a mounted parade, except when a salute is to be

fired, every gun shall every round be laid for a range named by an officer on a target pointed out by an officer. All officers ought to be much practised in pointing out a target; and commanding officers ought to practise changing the target when batteries are firing.

*Wagons and Supply of Ammunition.*—Our number of wagons is better than the foreign number, because with our fewer wagons we are more mobile and our column of route is shorter, and because it is better to count on the timely arrival of the divisional ammunition column than to encumber the batteries with more wagons. If it is supposed that more ammunition than is with the batteries and the ammunition column may be wanted in our battle, wagons ought to be added to the ammunition column.

It is directed that, when ammunition is to be supplied to guns in action from the wagons, the gun limbers are to cast their portable magazines and at once to move at a trot to the line of wagons. The direction is given, no doubt, in order to save the gun limbers, and to prevent the meeting of the gun limbers and their wagons in the battery; but it is advisable to make it more clearly understood that the gun limbers are not to go away without the order of the officer commanding the battery, and that he is not to give the order until he shall be satisfied that he will not be kept waiting for his wagons.

It is not apparent that we have gained by adding to our drill the foreign system of taking ammunition from the wagons. Our old plan of interchanging gun and wagon limbers met all cases, and had the advantage of simplicity. Full limbers could then, as now, advance from the line of wagons to take the guns on. The wagons could not move, it is true, until the limbers which had been in action with the guns were brought back; but that delay was of no importance. The disadvantages of bringing three wagons into a battery are that it makes too much to do on coming into action, that when it is all done men from half the guns must leave their subdivisions and cross an interval to fetch ammunition, that the system is not applicable to batteries advanced into a field of battle, and that it gives us two drills instead of one.

In tactical drill, and at all manœuvres, the wagons ought to follow their guns, and to move under proper charge and correctly to their battle positions.

*Marching and Work of Horses.*—Not regarding the future of the particular horses we have in the ranks so much as the efficiency of the service, it seems that we ought to do some fast work. We might train every year so as to be at our best towards the end of the drill season, and the condition of the horses could then be proved by marches against time, and by long gallops in marching order. For the time of hard work we must give the horses an extra ration of oats.

In winter we ought to do some ordinary mounted work if we have ground to work on, and the route marches in marching order, with six horses to a wagon, ought to be long or fast. We must clip and clothe our horses if we mean to do any real work.

*Morale.*—Audacity and the spirit which overcomes fear are the first qualities in battle; but, as one arm may not be encouraged at the expense of another, nor one side of contending forces at the expense of the other, caution is taught at manœuvres. Except by an umpire at a manœuvre of opposing forces, artillery ought never to be told of what they cannot do on account of the fire of the enemy.

When we shall take the field our success will depend upon the discipline we shall have learned at home. The discipline of horse and field artillery may be maintained by our battery officers, as is their custom, being much on duty with their men, by four mounted parades a week in fine weather of the drill season not being thought too hard work, and by the pride of officers and men, each in himself and all in their battery, pride of bearing, pride of turn-out, and pride of doing their drill and duty well.

Discipline rules, and must rule, without regard to degree of merit; but it is desirable, and in part attainable, that the higher in rank shall be the more worthy, so that there shall be natural respect for rank at all times, and that in battle not only discipline shall cause men to look to their officers, and officers to their commanding officer.

The following note by Admiral P. H. Colomb on the strategic problem presented by the conflict now in progress between China and Japan should be carefully read by all who wish to study the war intelligently; in answer to a letter to the "Times" on "The Korean Capital from a Military point of view," he writes: "I have great difficulty in placing myself *en rapport* with your correspondent who writes to-day under the above heading. I fail to see the *apropos*. It seems to me as if a strategist in the autumn of 1808 had written of the strength of Cadiz. Knowing that the Japanese are the assailants, he suddenly claps them into a defeated but possibly defensive position before the war has properly begun. Torres Vedras was 'a very strong' position, but Wellington would have remained Wellesley had he landed in Portugal with that sort of idea in the forefront of his mind. No doubt it is possible that the Japanese may be ultimately assailed in this 'very strong' position, but it will surely be when the game is up. For it is a position just as capable of leaving the Chinese in full occupation of the Korea as Cadiz was of leaving the French in the full occupation of Spain. It appears to me that if the Japanese are now preparing to give battle in defence of Söul they must already have abandoned all hope, though otherwise they do not look the least like it."

"The strategical analogies are in very close resemblance to those of the Peninsula. The British object was to turn the French out of Spain; the Japanese object is to turn the Chinese out of Korea. All through the war, up to 1812, the allies held 'a very strong' position at Cadiz, but they might have held it till now without moving one Frenchman in Spain. Yet when Wellington, by the march upon Burgos, threatened the main line of the French communications, he immediately emptied Andalusia of Frenchmen and left Cadiz free. Its strength was neither here nor there. The French were ultimately driven out of Spain by transferring the sea base from Lisbon to Santander and the northern ports of Spain. Whether Wellington had reached Vittoria by land or by sea, the result would have been the same. To use a simile which will be well understood in the navy, Wellington made little way in clearing Spain until he substituted induced draught for forced draught."

"Strategically, Ping-Yang inlet and the Ya-lu inlet, mentioned this morning, are accurate representatives in the Korea of those northern ports in Spain. They lie across the Chinese communications, and the Chinese will find it impossible to advance if these places are held in force by the Japanese. Apparently the Japanese military authorities quite understand the position. They know that Söul is to be held, not there, but at Ping-Yang and Ya-lu. They mean to transfer the war to the north-west corner of the Korea by means of their command of the sea, just as Wellington was able to act with regard to Spain by means of his command of the sea. The strength or weakness of the Korean capital as a military position is not at present a point in the game."

*Massed Fire of 80 Guns (10 Batteries) at the Kiev Camp of Exercise 1893.* (Translated by Captain J. Vans-Agnew, 3rd Madras Lancers. Reprinted from the "United Service Journal of India.")—The following translation contains the observations of General Dragomiroff on the massed fire of 10 batteries of artillery, at the annual camp of exercise near Kiev, of the troops in the Kiev military district. In 1891 the translator visited the camp several times. There were 26 batteries of horse and field artillery there. The country is like that round Aldershot—undulating and sandy, with strips of fir copse. The observations refer to August, 1893.

*Fire of a Battery of 80 Guns.*—“The general idea was that the artillery of an army corps, advancing by two roads, receives the order to rapidly take up a position and cover the deployment of the army corps. The enemy was represented by three separate groups of targets representing artillery (48 guns). The batteries for the firing practice formed two brigades, each consisting of three light and two medium batteries. In each brigade the light batteries formed one group, and the medium batteries another group, each being under a group commander.

“The commander of the corps artillery began by uniting the medium artillery under one commander, making them into a division of four batteries. The two brigade commanders were then deprived of their commands, as only one group each

remained to them, each having already its own commander. However, by this disposition the corps artillery was formed into three groups corresponding to the disposition of the enemy. The transmission of orders, concentration of the medium battery groups in one place, reconnaissance and movement to take up position, occupied 1 hour and 17 minutes. Where was the necessity for the formation of the third group, which took half an hour, and kept several batteries in an advanced position under fire? In spite of the slowness of the preliminary dispositions and movements, the position taken up by the batteries was by no means well chosen. The right flank was thrown back, and the range was extreme. Firing was commenced by batteries independently on account of the considerable range, but in certain cases commanders of groups gave batteries, whose firing was inaccurate, ranges taken from other batteries.

"In 8 minutes, it was announced that the enemy's left battery (18 guns) had ceased firing.

"With the intention of concentrating fire on the centre group of targets, the artillery commander sent verbal orders to the batteries of the group, which had silenced the group opposed to it, designating their new targets. From this position he was not able to see what was the best target for each battery of the group to fire at, and should therefore have confined himself to naming the target for the group, leaving the group commander to point out its target to each battery. The concentration of fire, however, did not take place, as the order was not delivered accurately.

"Having received the order to take up a more advanced position, the artillery commander sent a verbal order to the right group to advance, and to the other groups to commence their advance, when the right group should have opened fire from its new position. Four minutes later he completed this disposition by sending a verbal order to the left group to increase the rapidity of its fire. Without giving the right group time to take up its new position, the artillery commander altered his disposition, and ordered the centre batteries to advance without waiting for the right group to open fire, and 8 minutes later gave the same order to the left group. Thus, in place of an advance by échelons under cover of the batteries in position, there was an almost simultaneous cessation of fire, and an almost simultaneous re-opening of fire from the new position. Both at the first and second position fire was opened about 4 minutes from the time the batteries started.

"The intention had been to concentrate the fire of seven batteries on the centre group of targets, but as a matter of fact the damage done to this group was very slight. In a word, almost the opposite of what was intended took place. This clearly points to defects in the mechanism of command. Evidently the senior ranks want practice in command, and the groups are cumbrous and wanting in mobility. The movement of the batteries from the first position to the second, counting from the time the order was given to the first shot from the new position, occupied 22 minutes. The distance covered was between 400 and 600 yds. It is of course understood that an advance from a position at 3,000 yds. would not be only 400 yds., as that would not be worth while. But let us suppose that the batteries were stopped by a line of skirmishers 1,500 yds. off, then, on learning that the skirmishers had retreated, the advance should be continued, because the chief object for the action of artillery is not this chance target, but the main position and force of the enemy. At the nearer ranges from the second position fire was carried on independently by batteries, as was regulated by the circumstances. But on the appearance of new targets on the main position (raised targets and smoke balls) representing fresh batteries arrived in line, and closed bodies, the commander of the artillery and group commanders should have taken the command into their own hands. It was wrong to confine themselves to ordering the right group, or centre échelon, to fire on the reserves generally. It was necessary to point out special targets. The commander of a group does not know if he alone is firing at any target, or in conjunction with others, and consequently the firing might become extremely confused and objectless. The group commanders, therefore, should not only have pointed out targets to groups, but should have divided the target among the batteries of the group. This should be mere A, B, C; but it does not seem to be completely understood.

"The result of the firing at the longer distance showed 0·7 hits to shells fired, and at the shorter distance 1·2. This is poor. The rate of firing in the several batteries in the first position was seven shots a minute. At the nearer distance, from which fire was only kept up for five minutes, the rate did not exceed five shots a minute. This is, of course, insufficient, but is partly explained by the bad position chosen for the batteries at the second distance, from which the targets were not well seen, and also points to slowness of fire, which is generally more evident, in proportion to the shortness of time fire is kept up on each target.

"As a general conclusion I must observe that I see considerable success in the work of batteries independently. But the batteries do not know how to work together. Absence of practice leads to great slowness in combined action, and paralyses the efficiency of fire.

"It is a strange thing that 10 batteries, which separately are sufficiently mobile and efficient, should become a clumsy and immobile unit, the only reason appearing to be, nothing inherent in the formation, but only that each waits on another, and gets in another's way.

"The service of transmission of orders was weak. Orders were distorted, and the report sent in by the officer observing the course of the fire was without signature, and neither the time nor place of observation and despatch were noted.

"It is not possible to remedy these weaknesses, by the method of practising group firing only, especially on such a large scale, because the expenditure of ammunition would be prohibitory. Gunners and officers must practise unremittingly in the field."

"The Illustrated London News" of 18th August, and the New York paper "Once a Week," publish a sketch of Wolfe's sword, once the property of Lieutenant-Colonel A. R. Dunn, V.C., formerly of the 11th Hussars and afterwards of the 100th Regiment (Royal Canadians), which, together with the latter's medals and Victoria Cross, were recently purchased from a dealer by the Minister of Militia in Canada, and deposited in the Library of the Parliament House, Ottawa. Wolfe may have possessed more than one sword, but as this particular one is reported to have "played so important a part in the history of Canada," it may interest our readers to learn that the sword carried by General Wolfe in his last campaign, and particularly when he fell at Quebec on 13th September, 1759, is now in the Museum of the Royal United Service Institution, having been presented by Mr. George Warde, of Beechmont, Sevenoaks. There is no doubt whatever as to the genuineness of this sword, which was bequeathed by the General's mother, Mrs. Henrietta Wolfe, to the hero's lifelong friend General the Hon. George Warde, Colonel of the 4th Dragoon Guards, who acted as her executor. From General Warde it came into the possession of his nephew, who presented it to the Institution. The sword now in the Ottawa Parliament House was not worn by General Wolfe when he fell; nor is there any evidence that it ever belonged to him.

R. H.

**Austria.**—The "Kaiser Jäger" performed a somewhat remarkable march on their way to take part in the manœuvres in the lower valley of the Inn. In order to arrive at the scene of action they had to cross the Zillerthal Alps by way of lofty and dangerous passes. Starting from a level about 2,000 ft., they had to ascend to 8,383 above the sea at the Hundskehl Joch, 8,360 at the Hörndl, and 9,500 at the Napf Joch. Heavy baggage and officers' horses were sent round by train, but the men carried full marching order.

One of the battalions that marched across the Hundskehl Joch accomplished the march in 13½ hours, without resting even for a minute on the road from St. Peter to Mairhogen. The other battalions reached the Zillerthal after from 16 to 19 hours' march. The troops had to contend with great difficulties on their way. The rain fell in torrents throughout the day, and near the mountain top they encountered a blinding snowstorm. One of the battalions that had to cross the Mitter Joch found the usual road quite impassable through snowdrifts, and the troops were, therefore, forced to make a great circuit, and to cross the Napf Joch. When the troops, who were often forced to creep on all fours, had arrived at the

Napf Joch, 9,500 ft. high, and were about to descend the Rosskaar, the guide attached to the battalion lost the way, which was only discovered after a long search. To this battalion fell the honour of performing the most difficult march of the day. They had in all to pass sixty-three mountain torrents, often wading up to their waists in water.

**France.**—Assassination of the President. From the evidence of General Borieu before the Court of Assizes at Lyons, the opportunity for the approach of the assassin within striking distance of the President arose in the following manner:—The horse of the officer on escort duty became unmanageable, and since the vehicle was very low, the rider reined back, to avoid an accident, thus giving the opening precisely at the moment and spot where Caserio was ready to take advantage of it. A more extraordinary fatality it would be difficult to imagine, and its lesson should not be lost by officers on similar duty in our own country.

**Germany.**—The "Revue du Cercle Militaire" reports that a light field railway has been laid down near Klausdorf by the German Railway Troops, and subjected to exhaustive tests. The line (gauge not stated) was laid direct on the soil without formation or ballast, and in its length of 13 kilometres traverses numerous ascents. Heavy trains at half-hour intervals were run over it day and night for a week in succession with satisfactory results.

A similar line is also being tested in the siege manœuvres before Vaujours. We should be glad to receive full details from any member in a position to furnish them, as the subject is of considerable importance.

On the 14th of August the Direction of the Rhenish railways, right bank, took over at Cologne 1,000 covered goods wagons, 1,000 open ones, 1,300 coke wagons, 450 carriage wagons, in all 3,750 wagons capable of carrying 15 tons each. This brings the available resources for mobilization to 355,233 against 309,643 in France; the French wagons also are for the most part only designed to carry 8 tons.

("L'Avenir Militaire.")

A new field kitchen on wheels, to accompany troops on the march, is to be tested in this month's manœuvres; from the reports received, which are provokingly scanty, it appears to be based on the principle of the Norwegian cooking stove, *i.e.*, the kettles are surrounded with some non-conducting material, so as to retain the heat after the fires are drawn.

**Norway.**—The Army Commission has decided to proceed with the rearmament of the infantry forthwith. The weapon selected is the Krag-Jörgensen magazine rifle, five cartridges 6·5 mm. (0·265 in.), weight of projectile 10·1 grains (155 grains), and initial velocity 700 m. (2,296 ft.), and weight of rifle 4 kilos. (8·8 lbs.). 20,000 stand have been ordered in foreign countries, and the State factory will supply 4,000. These will suffice for the line battalions. The Reserve battalions will retain the existing weapon, calibre 10·15 mm. (0·4 in.), until 70,000 of the new ones are in stock; how and when these are to be provided does not appear.

**Turkey.**—Howitzer batteries. The formation of two regiments of six batteries of 12-cm. howitzers each is being proceeded with. They will be attached to the 2nd and 3rd Corps (Adrianople and Monastir). Each battery will have an establishment of four officers and 130 men, 20 more men than the existing field batteries. The guns are expected to arrive next month, but no credit has been taken in the budget for the additional horses, about 1,000, that will be required. We may here note that the proportion of field guns allotted to each corps by the Reorganization Commission of last year is abnormally large. Each of the first five corps has six regiments of six batteries, each of six guns, and an independent brigade of horse artillery of three batteries, giving 234 guns per corps. These figures are taken from the "Reichswehr," a paper usually well informed on Turkish matters.

## FOREIGN PERIODICALS.

## NAVAL.

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**Italy.**—*Rivista Marittima*.—Rome. August and September, 1894. “Water-tube Boilers” (N. Soliani). “Considerations on the First Theme of the Italian Naval Manœuvres of 1893” (D. Bonamico) (conclusion). “On the Right of Search” (A. Mazza). “Inflammatory Compositions, the Origin of Gunpowder and the First Artillery” (E. Bravetta, Lieutenant Italian Navy). “The Administration and Payment of the Seamen of the Fleet.” Letters to the Editor: “Disembarkations” (C. Avallone). “Naval Militia on board the Monitor ‘Passaic’” (A. M. Massari). Naval Notes: France, Germany, England, Italy (Trials of Sardegna, with indicator diagrams), Russia, United States, and Sweden. Notes on Gunnery, Torpedoes, Electricity, &c. Notices of Books.

**Russia.**—*Morskoi Sbornik*.—St. Petersburg. June, 1894. “Regulations for the Amu-Darja Flotilla.” “An Enquiry into the Elements which constitute the Fighting Value of Ships.” “The Vibration of Steamers.” “The Sea-route to the Yenisei River.”

**Spain.**—*Rivista General de Marina*.—Madrid. August, 1894. “Description of the Faroe Islands, their Harbours and River-mouths, with Instructions for Navigating among them” (Lieutenant R. G. Vela, Spanish Navy). “Aid to the Wounded and Shipwrecked in Maritime Wars.” “The War in Brazil and the Naval Lessons to be drawn therefrom” (Lieutenant D. M. Rubio Muñoz, Spanish Navy). “Torpedo-boats” (Lieutenant Moya, Spanish Navy). “The War in Corea.” “The North Pole” (Lieutenant D. I. Sobral, Spanish Navy). Naval Notes, Home and Foreign. “On Steel for Guns” (continued).

**United States.**—*The United Service*.—Washington. September, 1894. “A Lesson from the ‘Chicago’” (Nauticus). “Origin and Developments of Steam Navigation” (the late Rear-Admiral Treeble, U.S.N.) (continued).

## MILITARY.

*Journal of the Royal United Service Institution of India*. No. 116. “Cavalry Formations,” by Lieutenant-Colonel P. Neville, 14th B.L., advocating single rank and short échelons, as against the Frederician system, the bulk of the force in first line. “Notes on Native Cavalry,” by Captain Stockley, 16th B.C.; practical and suggestive. “A Plan for rapidly Adjusting the Backsight of the M.H. Rifle for Ranges up to 900 yards,” by Colonel Abbott, 15th Sikhs. “Massed Fire of 80 Guns (10 Batteries) at the Kiev Camp of Exercise,” translated by Captain Vans-Agnew. “Home through Persia,” by Lieutenant Buist, 2nd Lancers, Hyderabad Contingent. “A Retreat from India;” lecture, by Colonel Holdich, C.B., R.E. “Translations, &c.”

**Austria.**—*Mittheilungen über Gegenstände des Artillerie und Genie-Wesens*. Vienna, Nos. 8, 9. “H.I.H. Field-Marshal Archduke William,” obituary notice. “The Problem of the Movement of a Projectile in the Bore of a Heavy Gun,” by von Wuich, Colonel in the K. K. Artillery Staff. “Improvements in the Manufacture of Cast Iron and its Applicability to Armour Plates,” by Lieutenant-Colonel Tilschke, K. K. Engineer Staff. “Optical Signalling,” by Dr. Wächter, with plates. “Ships *versus* Forts,” regulations for the fire of coast batteries in France. “Experiments with the 12-cm. Q.F. Shielded Mounting.” “The Dangers of Storing Explosives.”

*Reichswehr*. No. 655. Obituary notice on the Archduke Wilhelm, Field-Marshal and Inspector-General of the K.K. Austrian Artillery. No. 656. Leader on the proposed alterations in the Military Code. Nos. 657, 658, and 659. “The War in Korea.” No. 660. “Our Field Batteries,” worth reading. Nos. 661 and 62. “Landwehr and Landsturm in the Cisleithan Provinces.” “Exercises of Regiments at full War Strength.” “Von Hobe Pasha.” No. 663. “The March

of the 16th Infantry Brigade over the Zillerthaler Alps, 10th and 11th August." No. 664. "Army Inspections." "Recalling of retired Officers to the Colours." According to the Budget proposals, 2,500 retired officers will have to be recalled for permanent service; the situation discussed. No. 665. "Course of Instruction for History Teachers." No. 666. "Young and Old Soldiers." Sensible article on the need of tact in dealing with Reserve men recalled to the colours. "On the March in the Punjab," reminiscences. No. 667. "The Future of Constantinople." "The Reorganization of the Landwehr."

**France.**—*Journal des Sciences Militaires*.—August. "Our Colonial Forces," by General Lewal; a study showing clearly the difficulty of maintaining an efficient colonial army in a country compelled to adopt the principle of universal service. "The Tactics of the Three Arms." "Horse Artillery in Cavalry Engagements." "The Campaign of 1814," M. Weil. "Night Operations in Field Warfare." "The War in Mexico."

*Revue de Cavalerie*.—August. "Tactics and the combined Action of the Three Arms." Anonymous. A very remarkable article. The author is a cavalryman, and treats of his own arm with a thorough grasp both of principle and detail, of the artillery with judgment but less accuracy, and of the infantry with fairness and appreciation. The "man" not the "weapon" gives the keynote of his composition, and "command" not "regulation" affords the best guarantee of combined action. "Marches of the French Cavalry in Turkey, 1854-55." "The Provisional Regulations of the 11th May, 1894, and the Practical Instructions of the 10th July, 1884." "Reinforcements and Remounts for the Grand Army, 1806-1807." "The Officers of the Don Cossacks." "30th August, 1870; a Reminiscence."

*L'Avenir Militaire*.—3rd August. "Waterloo." Highly appreciative review of Lord Wolseley's articles on Napoleon, in the "Pall Mall Magazine." "Overdoing it." Sensible protest against proposed further assimilation of the uniform of officers and men. "The Administrative District of Laghouat." "Kassala." 7th August. "The Soldier's Meat Ration." "The new Infantry Regulations." "Infractions of Disciplinary Principles." "New Tariff for Forage Rations." 10th August. "M. Turpin's Invention." "Grey Overcoats." "Camp Cooking Gear." "Re-engagements in the Colonial Army." 14th August. "M. Turpin's Invention." "Mr. Maxim's Flying Machine." "The new Infantry Regulations." 17th August. "The Soldier's Meat Ration." Promotion of Reserve Officers and of Officers in the Territorial Army." 21st August. "Recruiting in 1893." "The Grey Overcoat," an interesting protest from an officer of the Army of the Rhine, 1870. "The 5th Cuirassiers at Mouzon." "Reorganization of the Artillery according to the Law of 1893." 24th August. "The Manoeuvres of the 4th and 11th Corps." Leader complaining of the unwise parsimony of the Government as evidenced by the details of the scheme. "Reserve Officers from the Polytechnic." "The Soldier's Meat Ration." "The new Infantry Regulations." 28th August. "The German Army from 1874 to 1894." "New Regulations for the Supply of Ammunition in the Field." "The Soudan." Notes on Colonel Bonnier's expedition. 31st August. "The Second Portion of the Contingents, 1891-1892." "Functions of Artillery Captains." "Abuses of Authority," with reference to recent occurrences in Algeria.

*Revue d'Artillerie*.—August. "The New Austrian Machine-gun, Pattern 1893." "The Pitch of the Screw-threads in Breech Mechanisms." "The Material of the German Heavy Artillery," with plates.

*Revue Militaire de l'Étranger*.—August. "Military Pensions in Germany." "The Law on Recruiting and the Composition of the Annual Contingents in Russia." "The New British Infantry Regulations;" verdict, favourable but superficial. "Reorganization of the Italian Naval Academy." Austria-Hungary. "Long Distance Rides;" summary of recent competitions. "Bulgaria: The Officers of the Army in 1894."

*Le Spectateur Militaire*.—15th August. “The New Infantry Regulations,” by L. Brun. “On Cavalry,” by a foot soldier; the foot soldier considers that infantry charged by cavalry will fire 100 rounds each and average 50 per cent. of hits! 1st September. “The Grand Manœuvres of the IVth and XIIth Corps: Instructions of the Director-General;” reprint and comment by Noel Desmaysons; worth careful reading. “The New Infantry Regulations,” by L. Brun. Book Notices, &c.

*Revue du Cercle Militaire*. No. 31. “Annual Meeting of the Union of Societies for Military Instruction in France.” “Marches and Manœuvres in the Alps.” “New Instructions for the Remount Department in Germany” (worth reading). “The Italian War School” (concluded). No. 32. “Marches and Manœuvres in the Alps.” “New Instructions for the Remount Department in Germany.” “The Italian War Budget.” “The Manœuvres at Vincennes.” No. 33. “The Gun *versus* Armour”—nothing original. “The New Instructions for the Remount Department in Germany.” “Marches and Manœuvres in the Alps.” “The N.C.O.’s School at Rio de Janeiro.” No. 34. “Mr. Maxim’s Flying Machine,” reproduced with illustrations from “Engineering.” “Marches and Manœuvres in the Alps” (concluded). These papers are of quite unusual value, and deserve attentive study. “Gun *versus* Armour.”

*Revue des Deux Mondes*.—“The Passage of the Niemen. I. Arrival at Vilna.” By M. Albert Vandal. “À propos of the Russian Alliance”—M. Étienne Lamy.

*Germany*.—*Militär-Wochenblatt*.—No. 64. “The German Musketry Regulations, 1893” discusses an article in von Löbell’s “Jahresberichte,” drawing an unfavourable comparison between these regulations and those of the Russians. “Africa—Native Troops for Cameroon;” scheme for training and disciplining native levies. No. 65. “The Battle of Loigny,” by Major Kunz, contains very interesting experiences of Major Kriebel, very important, showing the peculiarities of the Bavarian soldiers, confusion in the fighting line, &c. “Correspondence from Austria-Hungary.” “Recruiting in Hungary, 1848.” “Cooking in the Field.” No. 66. Same articles continued. No. 67. “Words of Command and how to give them.” A valuable contribution as to how to manage the voice with least injury to the organ; dozens of officers have to retire yearly from loss of voice. “Bayonet or Sword-bayonet.” “Notes on Infantry Fighting.” No. 68. “Lessons from War Experience;” discussion of von Scherff’s latest works. “Wire Guns in the United States.” No. 69. “The Honved Cavalry.” “Artillery and Engineer Schools in Portugal.” No. 70. “Lessons from War Experience” (concluded). “French Naval Estimates for 1895.” No. 72. “A French Opinion on the German Cavalry Manœuvres, 1893, in Alsace-Lorraine.” “The French Cavalry Manœuvres at Bléré;” abstract of articles in the “Revue de Cavalerie.” “Summary of Inventions of Military Importance.” No. 73. “Belgium in case of War.” “The New French Regulations for Field Service.”

*Jahrbücher für die Deutsche Armee und Marine*.—September. “A Hero of the Thirty Years’ War.” “The Defence of Kloster Labaschin, 29th September, 1794.” “The Drill Regulations of the Republic and First Empire” (continued); should be studied. “The Ram in Accident and in Action,” translation of Mr. Laird Clowes’s paper. “The Strategical Importance of the Canadian Pacific Railway.” “The New Russian Rifle and its employment.” “Recent Progress in Military Invention.” Book Notices, &c.

*Deutsche Heeres Zeitung*.—No. 61. “The Infantry Attack,” review of an Austrian translation of a work by Major-General Skugarewski, Chief of the Staff of the Russian Imperial Guard Corps, is worth reading. “Notes on the second Silesian War, 1744-45,” by Freiherr von der Wengen, very interesting; these notes run through the whole month’s issue. No. 62. “Construction of Batteries in Russia,” review of a report by Colonel Savantschow’s Russian Engineers on

experimental batteries executed by the 4th Brigade of Sappers at the camp of Powaski and at Novo-Georgiewski, worth study. No. 63. "The German Infantry," an Italian opinion translated from the "Rivista Militare." No. 64. "The Engagement between the Chinese and Japanese vessels in the Yellow Sea." No. 65. "A Russian Study on Cavalry Reconnoitring." No. 66. "Cavalry Reconnoitring" (continued), worth reading. No. 67. "French Opinions on the Reserve Officer Question," worth attention; in case of war 53,000 Reserve officers are necessary, i.e., there will be two Reserve officers to every professional officer. No. 68. "Cavalry Uniforms," no originality. "The Employment of Field Artillery." No. 69. "The Question of Fortifying Nancy," careful summary of French opinion on the subject, dealing at length with M. Charles Malo's work. Specially interesting to us as showing current Continental opinion as to the probable nature of the introductory phase of the next Franco-German war. "The Employment of Field Artillery," well deserving of study.

**Switzerland.**—*Revue Militaire Suisse*.—15th August. "The Infantry Cart-ridge," by Lieut.-Colonel Rubin, director of the cartridge factory at Thun—a very thorough and interesting study. "Autumn Manœuvres," with map. "The War in Corea," with map.

**United States.**—*Journal of the Military Service Institution*, September.—"The National Guard" (Colonel Rice). "The Care of the Wounded in time of War" (Captain Powell). "The Military Value of the Donkey" (Lieutenant Greene). "Intrenched Camps" (Lieutenant d'Armit, U.S. Engineer Corps). Paper read before the International Congress of Engineers at Chicago, an interesting summary of European literature on the subject. "War Ships or Coast Defences" (Lieutenant van Deuser). "Staff Service in the State Troops" (Colonel Gilchrist). "Military Railway Transportation" (Captain West). Historical Sketches: "The Ordnance Department," "The Fifth Regiment of Infantry," "The Thirteenth Regiment of Infantry," "The Twenty-third Regiment of Infantry." These short notices contain many interesting details of fighting on the Indian frontier, also of service in the Civil War. The 13th Regiment lost 43.3 per cent. in its victorious attack on the works at Vicksburg.

**The United Service.**—"General Dragomirov." His views on war. An interesting compilation mostly from German sources. "A Lesson from the 'Chicago,'" by Nauticus, reprinted from the "Fortnightly." "Origin and Developments of Steam Navigation."

## NOTICES OF BOOKS.

*Der Kürzeste Weg nach Konstantinopel. Ein Beispiel für das Zusammenwirken von Flotte und Heer.* By STENZEL, Kapitän zur See a. D. Kiel: Paul Toeche, 1894.

Captain Stenzel enjoys a deservedly high reputation, both in his own and other countries, as a writer on naval matters. The remarkably able critical essay which he published at the end of 1889 on our naval manœuvres of that year, and which attracted considerable attention not only abroad but also among naval authorities here in England, must still be in the memory of those who had the pleasure of reading it. Anything, therefore, emanating from the pen of an officer so thoroughly well versed in all that concerns not only his own country's navy, but those of other Powers, is sure to be well worth perusal.

In the little work before us the author wishes to show that Russia, by means of a carefully arranged plan of operations between the small but powerful Black Sea Fleet and a corps d'armée conveyed from Sebastopol, can seize Constantinople by a *coup de main*, and that without any great difficulty. Glancing briefly, in the first place, at the anxiety of Russia to obtain a sea-port free from ice, and also complete access to the great sea-trade routes for her ships, bound in as she is on the north by the Sound and the Great and Little Belts, and on the south by the Dardanelles, Captain Stenzel points out that, from the time of Peter the Great onward, the possession of Constantinople has been the goal which Russian statesmen have kept steadily before them. He quotes various authorities who, during the last few years, have written on this question, and also from the "Briefe über die Zustände und Begebenheiten in der Türkei, 1835-39," of the late Count Moltke, and as, in his opinion, they undervalue the power of the fleet, he subjects them to a sharp criticism; all modern writers appear to hold that the way through the Balkan States is now effectually barred, and that the attack must be made directly on Turkish soil; to do this they are agreed that the Russian fleet must command the Black Sea before any attempt could be made to land troops, but they doubt the power of the fleet to force the Bosphorus in face of the present fortifications, and it is on this point that Captain Stenzel joins issue with them. He refers to Admiral Duckworth's expedition in February, 1807, and, although commenting unfavourably on the Admiral's failure to take advantage of his opportunities after he had forced his passage through the Dardanelles, he points out that the straits were forced twice, although with some considerable damage to the fleet, and loss of life on the second occasion, and this in face of the fact that the Turks had had ample time for taking measures to attack the fleet when effecting its retreat again into the Mediterranean; the failure of the expedition he attributes to the bad management of the Admiral, contrasting his conduct with the splendid results obtained soon after by Lord Gambier in the attack on Copenhagen and capture of the Danish Fleet. Some interesting details with regard to the fortifications of the Bosphorus, Dardanelles, and the position of Constantinople and also of the Turkish Army and Fleet are given next, followed by some similar information as to the Russian forces and Black Sea Fleet, and the author then refers to the former operations by the Russians against the Turks, and also discusses some of the points raised by late writers on this vexed question of a successful attack on the Turkish capital. Captain Stenzel holds that the success of such an undertaking is, in the first place, a question of the fleet. The seizure of Constantinople, where all the reins of government are centred, would undoubtedly go far to paralyze Turkey, but the town cannot be held unless the fleet has not only command of the Black Sea, but of the Sea of Marmora and the Dardanelles, the southern end of which it would be necessary to bar against any entry of a hostile fleet, for should an enemy succeed in forcing his way into the Sea of Marmora the successful holding of Constantinople would be endangered. For Russia the possession of the capital would not be so important as the acquisition of the magnificent harbour, an important centre of trade and free access by sea into the Mediterranean, while for other nations the Black Sea would become a "mare clausum," and the whole coast trade would fall into Russian hands. It is a great prize to play for, and it can only be won by the hand-in-hand co-operation of the fleet and army and a carefully worked out plan of operations.

The author then proceeds to describe the method by which the capture of Constantinople and the seizure of the Dardanelles is effected. The opportunity is taken of the usual grand manœuvres in the autumn of the fleet and army, by which the necessary forces are concentrated without attracting any special attention. There are always some questions pending between Russia and the Sublime Porte. One of these is made the excuse for a quarrel, so when everything is ready for the contemplated attack, on the 1st September, the Russian Ambassador assumes a threatening tone and insists on compliance, within 24 hours, with some demands he has formulated; not receiving a satisfactory reply, he follows this up by a declaration of war on the following evening. The day before, two of the Russian volunteer fleet, nominally with troops on board for Eastern Siberia, pass down the Sea of Marmora; here they anchor, some mishap to their engines being made the excuse,

and on the following morning the Russian Fleet makes the long-matured attack, the forts, taken by surprise, are silenced, the Turkish ships are sunk at anchor by the Russian torpedo-boats, the Russian troops are landed under cover of the guns of the fleet at different points, and Constantinople passes into the hands of Russia; by the 7th the forts at the mouth of the Dardanelles, the last to offer resistance, are captured, and the English Fleet arrives from Malta to find the Russians in possession and the entrance to the Straits effectually closed. All the details of the attack and capture of the different positions are most cleverly and effectively worked out, and show how carefully Captain Stenzel must have studied his subject; the whole is so graphically described that it makes most interesting reading.

In conclusion, Captain Stenzel points out that the present state of the defences of Constantinople are very unsatisfactory, and that if Turkey is to retain her position it is not only necessary for her to complete the system of land fortifications, but to once more bring her fleet into a condition for meeting an enemy, and not only to modernize the ships but to see that the crews are brought up to a war footing, and, above all, properly trained by skilled officers. We strongly recommend Captain Stenzel's pamphlet to the study of all interested in the Eastern question.

H. G.

*La Flotte de Guerre et les Arsenaux.* ÉMILE WEYL. Paris: Plon, Nourrit et Cie. 1894. Price 3s. 6d.

Public attention, both in France and this country, during the last 12 months, has been much drawn to the French Navy, its organization, and general readiness for war; so the little book before us, the work of M. Weyl, the editor of the "Yacht," and the well-known writer on naval subjects, has appeared at an opportune time. It consists in the main of a series of articles contributed by the writer to the "Journal des Débats," when the Parliamentary Committee of Inquiry into the state of the French Navy was appointed this year. M. Weyl evidently believes that there is room for a good deal of reform; he complains that the Ministry of Marine is hampered by being obliged to perform duties having no real connection with the question of maritime defence, the primary duty for which the department is constituted. Although the colonial administration has now been separated from the marine, yet the Admiralty is still responsible for the training of the military forces of the colonies, and the author further considers that the whole naval organization is out of date, and the methods of work at the dockyards old-fashioned, and not by any means adapted to modern requirements, while many of the latter with their harbours are insufficiently protected, not only from bombardment by an enemy, but from torpedo-boat attacks. M. Weyl calls attention to the fact that since 1870 there have been 22 Ministers of Marine; sometimes a civilian, sometimes a naval officer has held the portfolio, which in 1892 changed hands no less than three times, and under these circumstances he considers it wonderful that any progress has been made at all. The chapters dealing with the organization and division of work at the Ministry of Marine are full of interest; in M. Weyl's opinion, the reason why an unsatisfactory state of things exists at present is not so much due to defects in the system of organization adopted, as to the fact that, owing to the constant changes brought about by the necessities of Parliamentary Government, no Minister remains sufficiently long in office either to make himself master of the different questions calling for solution or to institute necessary reforms. He also criticizes somewhat sharply the arrangements under which ships are designed and constructed, as he considers they are left too entirely in the hands of the naval architects, naval officers themselves not being allowed to exercise any supervision or control; and he quotes the department of the Controller of the Navy in England as better designed for the work than the system obtaining in France.

In Chapters 14, 15, and 16 M. Weyl discusses the different types of ships in the French Navy, and draws an interesting comparison between the actual and prospective conditions of the French Navy, as represented to Parliament by the English Admiralty Return of last February, and what, according to him, are the real facts of the case. He only accredits to France at the end of the century a prospective

strength of eighteen 1st class battle-ships, five 2nd class, and nine coast defence ships, making a total of 32 armoured ships (including ships building and proposed, and striking out, on the other hand, several of an early date and obsolete construction), as against 51 shown in the Return presented to the English Parliament, and he expresses a certain amount of sarcastic astonishment at the way in which that Return has been drawn up:—"C'est donc une masse de 32 bâtiments que nos voisins d'outre-Manche nous accordent pour la fin du siècle; en comptant largement, nous n'en trouvons cependant que 32. Cela donne une idée de la façon dont on dresse les tableaux comparatifs; le document Parlementaire Anglais comptait parmi nos cuirassés tout navire portant une armure, sans s'inquiéter de l'âge, du système de construction—bois ou métal—des qualités de navigabilité! Un tel procédé n'a rien de scientifique; mais les choses de la mer sont si peu connues, même en Angleterre, que grâce à lui, le Parlement a voté les crédits nécessaires pour une grande augmentation de la flotte Britannique. C'est le but qu'on poursuivait."

The Appendix contains, among other details, the official "procès-verbal" of the experimental committee of the port of Toulon, which was ordered to conduct the trials of the "Magenta" for stability in presence of the Parliamentary Committee of Inquiry into the Navy, and also lists of the new ships completing in France, England, Russia, Italy, Germany, and the United States.

We can commend M. Weyl's little book to naval officers, containing as it does a great deal of interesting matter, put in a very readable form. H. G.

*Records of the Militia Battalions of the County of Southampton, 1757-1894.* By Colonel G. LLOYD-VERNEY. (London: Longmans, Green, and Co.)

In the matter of printing, binding, illustration, and general execution, this volume compares favourably with the best regimental histories hitherto written. Such a publication can only have been produced by an expenditure of much time, patient research, and careful study, combined with a pecuniary outlay such as few officers are in a position to embark upon. Hampshire, or more correctly speaking, the County of Southampton, has within the last 140 years furnished the army with several Militia battalions, the lineal descendants of which may be recognised in the present 3rd Battalion Hampshire Regiment and the Hampshire and Isle of Wight Artillery. For the account of the latter regiment since its formation in 1853 we are indebted to Lieutenant-Colonel J. Mouat F. Hunt; but the remaining portion of the book, embracing the records of seven other regiments from 1757, has been carefully, conscientiously, and, on the whole, accurately compiled by Colonel Lloyd-Verney, commanding the 3rd Battalion Hampshire Regiment. Even a cursory glance over the work is sufficient to show that its compilation must have entailed an immensity of trouble and research; and, though we do not admire its interior arrangement, it is impossible not to admit the interest and pleasure derived from a perusal of its pages.

To many the uneventful life of a Militia regiment may appear dull reading, but thoughtful military men cannot fail to experience interest in the internal military arrangements of this country during many critical periods of its history. The Hampshire Militia battalions, of which this work treats, were raised in 1759—not in 1757, as stated by the compiler—and their subsequent embodied service includes the periods of the Seven Years' War, the War of Independence in America, the long French war, which commenced in 1793 and lasted almost continuously until 1816, the Crimean War, the Indian Mutiny, and the Egyptian crisis in 1855. Few people of the present day realise what the Militia regiments of a century ago were like, but the confidential inspection reports show conclusively that they were magnificent bodies of men, both in efficiency and physique. Colonel Verney has done justice to the services of his county regiments, but a limited space prevents our following their movements as closely as we should wish. Their history embraces, in addition to the period of the Gordon Riots in 1780, when the North and South Hants were encamped in Hyde Park, many other equally important epochs; and, perhaps the most interesting of all, the time during which Edward Gibbon, the historian of the Roman Empire, served in the South Hants, with, on his own

admission, such advantage to himself. "The discipline and evolutions of a modern battalion," he wrote, "gave me a clearer knowledge of the phalanx and the legion; and the captaincy of the Hampshire Grenadiers has not been useless to the historian of the Roman Empire." Gibbon was at that time captain of the Grenadier company of the South Hants, and the old pointed cap worn by his subaltern, similar to those depicted in Hogarth's "March to Finchley," is now in the Museum of the Royal United Service Institution. It is a curious fact that a year after Gibbon resigned the command in 1770, William Mitford, author of the "History of Greece," was appointed to a company and eventually commanded the regiment.

Though the book has been carefully written, it is not altogether free from errors. The Act for the reorganization of the Militia was passed in 1757, it is true, but neither the North nor the South Hants regiments were raised till 1759. They were not reported complete till the summer of 1759, and the warrant to supply them with arms and accoutrements was only dated the 20th July of that year. Similarly in regard to the Isle of Wight Militia; the corps was not raised till 1771, their first issue of arms and accoutrements being authorised on 26th May. On page 64 the author falls into serious error in regard to the precedence of the Militia. It was never settled in 1777, but in 1778 numbers were first drawn by lot to determine the precedence of the several regiments for one year: a practice which was continued annually till 1782. From 1778 till 1783 the Hants regiments bore the following numbers in succession:—1, 42, 3, 10, 15. They bore the number 13 from 1793 to 1802; and from 1803 to 1833 the number 15. In 1833, the North Hants became the 13th, the South Hants the 43rd, and the Isle of Wight the 63rd. Again, on page 239, it is stated that the hair of the men was cut short and pigtailed discarded in June, 1814. Pigtails, or queues, were abolished by General Order of 20th July, 1808, nearly six years earlier. On page 281, line 24, the Supplementary Militia are stated to have been abolished in 1798, while on page 287, four years later, reference is again made to the force. There are other errors in the lists of officers and elsewhere, which will no doubt be corrected in a future edition.

The book is, notwithstanding, an excellent production. The illustrations, which include a frontispiece of the Duke of Connaught in the uniform of honorary colonel of the Hampshire and Isle of Wight Artillery, a reproduction of Sir Joshua Reynolds' portrait of Gibbon, and a favourite likeness of Lord Palmerston, are well executed. Indeed, the whole publication is very creditable to Colonel Verney, and a welcome addition to military literature.

R. H.

*Mémoires pour servir à l'Histoire de Napoléon 1er, depuis 1802 jusqu'à 1815.*  
Par le BARON CLAUDE FRANÇOIS DE MÉNEVAL, Secrétaire du Porte Feuille de Napoléon, &c. Paris: Dentu, 3 vols. 1894. Price 18s.

It is very evident from the perusal of the last two volumes of this work that Napoleon fully understood that in diplomacy, as in charity, it is as well not to let "your right hand know what your left hand doeth," for, though de Ménéval doubtless wrote his account of diplomatic transactions in all good faith, he appears to have been entirely unaware of the instructions in an exact contrary sense the Emperor was simultaneously dispatching to his marshals.

These instructions were not generally accessible until after the author's death, and therefore we can excuse him of all except overweening personal vanity; but the same excuse will not serve the compiler, who out of respect to his father's memory ought not to have foisted on the public a work so little creditable to his parent's intellectual ability.

Nevertheless, though the military data are glaringly inaccurate, the work deserves the careful attention of all soldiers, for it demonstrates in a remarkable manner the enormous advantage which accrues to a commander who unites in his own hands the supreme direction of both military and political power.

It is one of the current mistakes of the age to see only in Napoleon's victories the consequence of strategical and tactical superiority; neither are sufficient to account for the results, and if we eliminate from our consideration the instances when the possession of this power to initiate diplomatic proceedings, or to arrange his own terms of peace, enabled Napoleon to confirm successes already obtained or

to avert impending disaster, our strategical conclusions based on the military operations only will be most seriously discounted.

This is especially the case in the campaign of 1814. Judging without reference to diplomatic considerations and from French military data only, the campaign has been made to appear a triumph of the principle of "interior lines." It was Napoleon's strategic skill that so brilliantly held the overwhelming masses of the allies at bay; but, read by the light these memoirs shed on the subject, it is very evident indeed that it was not the brilliant strategic combinations, but the power Napoleon possessed of acting diplomatically on the chiefs of the coalition, which enabled him for so long to defy their numbers. If after the victory of La Rothière the allies, refusing all diplomatic relations, had marched steadily forward, no strategic skill and no gallantry on the part of the men could possibly have preserved his little handful from disaster; but by carefully playing on the feelings of the allied chiefs Napoleon was able to prevent in every instance, until the 1st of March, that combination which would have ensured his destruction, and thus to obtain the opportunities of falling on isolated fractions of his enemies of which he so successfully availed himself.

Throughout, the work is animated by a spirit of the bitterest hostility to Great Britain, and so far we are grateful to the author for this tribute to our consistency and influence; Europe, especially Teutonic Europe, is too apt nowadays to overlook the debt of gratitude it owes to the Power without whose support two-thirds of it would still be languishing under a foreign yoke; it is not a bad thing that it should be reminded of the fact. Nevertheless when we take into consideration the part we played in rescuing the Emperor from an ignominious and premature death, and when, too, we recall the asylum England has always afforded to his family when in distress, good taste ought to have prevented any Bonapartist from penning the concluding paragraphs which we herewith reproduce in full: "Des efforts combinés renverront, tôt ou tard, cette intolérable domination, et Napoléon a préparé l'abaissement du tyran des mers. Si l'excès du despotisme maritime Britannique suscite, un jour, des continuateurs de son œuvre, les mânes de l'Empereur seront enfin consolés. On peut prédire à coup sûr, et nous ne croyons pas mériter d'être démenti, qu'en vengeant le martyre de Jeanne d'Arc et de Napoléon, la décadence de la puissance Anglaise ne laissera pas à l'Europe un seul regret."

F. N. M.

*The Organization and Administration of the Line of Communication in War.* By Colonel GEORGE ARMAND FURSE, C.B. London: Clowes, 1894.

The title is the only unstrategic point about this work; it recalls too many memories of days of weary drudgery amidst depressing surroundings, and we can only express our wonder that the author did not prefer the definition of his subject he gives us in the first line of his work, viz., "the maintenance of an army in the field," which, to our mind, covers the range of the matters he deals with far more accurately.

The key-note of the whole book is given by the following extract:—"It should always be a standing rule that a chief or superior officer should never meddle with anything which any of his subordinates are competent to do as well as himself. The officer who will persist in doing everything himself, and who will not take his principal subordinates into his confidence, is a bad public servant," which all means "decentralization," a principle which may with benefit be applied over a far wider field than is covered by this book.

The method adopted is to argue out the reason "why?" marshalling the facts in the order of their importance and in sufficient numbers to prove that the ultimate conclusion reached rests on an adequate foundation, a method unfortunately inapplicable to regulations, which must be confined to "ordering," and cannot launch out into explanation; but the intelligent application of regulations is only possible to men who have thought out the reasons for them, and hence the work forms an indispensable guide to all who would make themselves thoroughly efficient.

We say "all" advisedly, for it is not enough that the departments immediately

concerned should understand their work. In proportion as a knowledge of the difficulties each has to contend with is more widely diffused their combined action will be facilitated, friction will be diminished, and the whole machine will develop its maximum energy with the minimum expenditure of labour.

For these reasons we earnestly recommend the study, not the mere perusal, of this book to all ranks of the Service; many of the points raised may seem to the junior officer beyond his sphere, but he should remember that time does not stand still for any man, and if he does not utilize his opportunities for study now, it will be too late to make up when responsible command is perhaps thrust on him.

F. N. M.

*Problems of the Far East. Japan—Korea—China.* By the Hon. GEORGE N. CURZON, M.P. London: Longmans, Green, and Co.

This book is singularly fortunate in the moment of its birth. It brings together between its two covers the great mass of what is generally known about the three countries concerned, and we do not think that the war, which is now testing the accuracy of his conclusions as to the fleets and armies of the contending nations, will compel him to modify them substantially. The most fascinating chapters to our mind are those final ones in which he combats Mr. Charles Pearson's theories as to the future of the yellow race, and reveals to the ordinary stay-at-home Englishman the magnitude of our interests at stake, and the basis on which our success has hitherto depended, and must always depend. Herein he is in entire accord with Mr. Benjamin Kidd ("Social Evolution"). Character, not intellect, is the dominating power in the East, and as long as we remain pre-eminent in this one quality we shall maintain our lead. Are we taking the right steps to preserve this lead? is the question we should ask ourselves, and the answer it is to be feared cannot be in the affirmative. While other nations are training all their able-bodied sons to bear hardships and privation uncomplainingly, and thus making men who can bring concentrated will-power to their work in life, we are encouraging ours by education limited only to book knowledge, to despise hard work and to look to the State to crush the onerous competition of better men. It was not by eight hour days that our empire was won, and it is a safe prophecy to venture that it will not be through eight hour days that we shall retain it.

F. N. M.

*Handbook of the Military Forces of Russia.* Prepared in the Intelligence Division of the War Office, by Captain J. M. GRIERSON, R.A., D.A.A.G., 1894. Price 2s.

To quote from the preface, "the object aimed at has been merely to give a short account of the numbers and organization of the military forces available on mobilization, together with such further information as may be likely to prove useful to officers watching the operations of the troops in time of war, or attending manoeuvres in peace time." Captain Grierson's name is sufficient guarantee of its accuracy, and to save his labour being allowed to lie fallow on the bookshelves, the book has been issued in a convenient portable form.

F. N. M.

*Histoire de la Guerre de Crimée, par Camille Roussel (de l'Académie Française).* Paris: Hachette. 2nd Edition. 2 Vols. 1894. Price 6s.

After the torrent of virulent abuse of all things British that has been issuing from the French press for the past two years, and through which our avocation compels us to wade, it is a great relief to take up a temperate and fairly written history of the war in which the two nations fought as comrades. The conduct of our troops at the Alma, Balaclava, and Inkermann receives full praise, and the generalised descriptions of these actions leaves, perhaps, a better idea of the proportion of events on the mind than the more detailed histories usually perused. We can only regret that our own writers have not always approached their subject in the same spirit of impartiality.

F. N. M.

*The Great War in England in 1897.* By WILLIAM LE QUEUX. London: Tower Publishing Company. 1894.

Mr. Le Queux has done good service in bringing before the eyes of the average British voter the consequences which must inevitably happen to him personally if he neglects to insist on the provision of a navy adequate to maintain unchallenged command of the sea.

Perhaps it would have been better had he not placed the fulfilment of his prophecies in so near a future, for people are tempted to inquire whether three years hence our naval resources will fall so far short of the needs of the situation as he assumes; but the answer, in whatever sense it may be given, does not affect his point, which is, that if the nation does not build and man ships this will be the inevitable consequence. Again, whether the fleet exists or not, and therefore with the knowledge we possess of "sea power," the idea is feasible or not, does not affect the question as closely as our naval experts incline to believe, for though we may know any such attempt to be foredoomed to disaster, the other party to the quarrel may take a very different view of the matter; and actually the question is open to argument. Let us consider for a moment Napoleon's chances in almost any one of his successful campaigns as they appeared or ought to have appeared to well-informed statesmen of the day, judging the matter by all existing data of the relative strength of the contending parties, but eliminating the factor of "time." In almost every case it will be found that the apparent chances were against Napoleon, and a look at the relative positions of the contending parties at the moment of the conclusion of peace will show that—eliminating the factor of time—this view was well founded, e.g., Campo Formio, Leoben, Austerlitz, Jena, Wagram, Moscow. Now we are making this very mistake, viz., disregarding the factor of the time required to develop our latent fighting power, and looking at the matter dispassionately, we are compelled to admit that the risk of a raid by 200,000 men on London, given even a temporary command of the Channel, would be less from every point of view than the risks victoriously incurred by Napoleon in nine-tenths of his campaigns.

Mr. Le Queux has also scarcely done himself justice in the design of his book. Its popularity would not have been jeopardised in the least by the addition of more detailed information as to the actual strategic development of the situations. Reading the book carefully, it is evident that he had a concrete idea before him as he wrote, but it takes some close thinking, and a fairly complete knowledge of the country, to judge whether the plan is in accordance with probability or mere assertion based on inaccurate data. In our opinion, based on twenty years' close study of the problem, the sequence of events is probable, and the data essentially correct. The weakest point is the cause of the war, the signing of an offensive-defensive alliance between Germany and England, so far from precipitating a conflict would, in all probability, render the indefinite postponement of all such offensive ideas a matter of certainty. If the public is to be educated through books of this nature, then the better plan would be to evolve a war from conflicting trade interests. This would be more intelligible to the readers and more in accordance with the probabilities.

F. N. M.

*Extracts from an Infantry Captain's Journal. Trial of a Method for Effectively Training a Company in Skirmishing and Outpost Duty in a Limited Time and under Unfavourable Circumstances.* By R. VON ARNIM, Major, Hohenzollern Fusiliers, No. 40. Translated by Major C. J. EAST, D.A.Q.M.G., 41st Regiment.

Major von Arnim's work will always remain one of the most valuable guides to the training of a company, and it has now stood the test of prolonged experience, having originally appeared about 1873. In consequence of numerous applications from members for advice as to the best work to study for assistance in company training, it was proposed to republish Major (now General) East's translation, when fortunately some 70 copies of the original edition were discovered in a store room at the Institution. Members can obtain copies on payment of 2s., sent to the Librarian, R.U.S.I.

*The Downfall of Lobengula: the Cause, History, and Effect of the Matabeli War.*  
By W. A. WILLS and L. T. COLLINGBRIDGE. With contributions by Major P. W. Forbes, Major Sir John Willoughby, Bart., Mr. H. Rider Haggard, Mr. F. C. Selous, F.Z.S., and Mr. P. B. S. Wrey, A.M.I.C.E. London: Simpkin, Marshall, and Co. Price 6s.

This is a book we can cordially recommend, the names of the contributors are a sufficient guarantee that we have here first hand evidence of the greatest value. It is unfortunately disfigured by some very second-rate illustrations, but it may be trusted to survive this minor drawback. The maps, on the other hand, are clear and intelligible.

F. N. M.

*Erfahrungen eines Truppenführers.* Von ALFRED FREIHERR VON EBERSTEIN, Colonel 3rd East Prussian Grenadiers. No. 4. Darmstadt and Leipzig. 1894. Price 1s. 6d.

The writer gives his experience as captain, major, and colonel of a Prussian regiment, and in so doing sheds much light on the relations between officers and men, greatly to the credit of both. The book will serve as a useful corrective to those who form their opinions as to the degree of bullying existing in the German Army from the utterances of irresponsible press correspondents.

F. N. M.

*Linien Verschanzungen in Mittel Europe im 17ten und 18ten Jahrhundert.*  
Von KLEEMAN, Major-General in the Bavarian Army, a.D. Darmstadt und Leipzig. 1894. Price 2s. 6d.

The little book comes as a useful reminder to those who believe that Plevna and its hasty entrenchments initiated a new factor in warfare. The contrary is the case, entrenchments were even more widely used in those days than in the more recent past, and more labour and skill was employed on them, but they fell as a consequence of the increased mobility evolved by Frederic and Napoleon, and it is a safe prediction to venture, that mobility will be the best answer to them in the future. "There is nothing new under the sun" should have been the writer's motto.

F. N. M.

*Addiscombe: its Heroes and Men of Note.* By Colonel H. M. VIBART. London: Constable and Co., 1894.

We cannot better recommend the above work than by reprinting the following extract from the introduction, contributed by Lord Roberts:—

"The history of a school which has produced in the short time it was in existence such a number of really great men—men distinguished by the share they had 'in the conquest and consolidation of the Indian Empire'—requires no words of mine to commend it to the general public; while for all old Addiscombe cadets, like myself, this record of an institution to which we owe so much cannot fail to have a peculiar interest. We must always feel proud of having belonged to a school which has sent forth such men as Henry Lawrence, Eldred Pottinger, Arthur Cotton, Proby Cautley, Robert Napier, Henry Durand, John Jacob, Baird Smith, Harry Tombs, Henry Yule, and many others—not only soldiers, but administrators—who throughout their glorious careers did their duty with that singleness of heart and honesty of purpose for which the Anglo-Indian official is so justly conspicuous, and which have gained for Englishmen the respect and confidence of the people of India.

"Life in India, where almost every European, whether civilian or soldier, is often placed at an early age in positions of great responsibility, in which his powers of self-reliance, calm judgment, and prompt action have continually to be exercised, has, no doubt, much to say to the remarkable ability displayed by our countrymen in dealing with great and sudden emergencies, and to their unhesitating and determined action in times of difficulty and danger. I think, however, that as 'the child is father of the man,' a great deal was due to Addiscombe. It was a rough

and ready sort of school, but the strict discipline and continuous work and study enforced there were good training."

*Souvenirs de Sébastopol.* Recueillis et rédigés par S.M.I. ALEXANDRE III, Empereur de Russie. Traduction de M. Nicolas Notovitch, d'après les originaux conservés au Musée Historique de Sébastopol. Paris : Ollendorf, 1894.

The translator of this work was well known in Simla in 1887, where his brilliant imagination attracted considerable attention. He gave out that he was special correspondent of the "Novoe Vremya;" that he was chevalier of the Order of St. George, and an officer in a Russian Cossack regiment. He was received with considerable favour until the "Novoe Vremya," having been apprised of the state of the case, let it be known that they had only three objections to his definition of himself, viz., 1stly, that he was not a special correspondent of theirs, and never would be; 2ndly, that he was not a chevalier of any known Order; and, 3rdly, that he was not an officer in any known Russian regiment. The evenings then becoming chilly in more senses than one, he migrated to the plains and endeavoured to approach various editors. They were compelled to admire his talents, but did not see their way to publishing the information he offered to supply, chiefly because what was new was not true, and what was not new was very old indeed. Not to lose the benefit he had conferred upon us entirely, Mr. Rudyard Kipling embodied his chief characteristics in that very remarkable story, "The Man who was," which is worth attentive study for more reasons than one. For a time he disappeared from sight. We caught occasional glimpses of him through the means of friends in Russia, but these did not prepare us for his startling resurrection the other day as the author of "La Vie inconnue de Jésus-Christ." This work claims to be based on ancient manuscripts discovered by the author during an illness in some Thibetan Lamasera. This work exhibits considerable falling off in the quality of imagination : given a few books of New Testament critical literature, and a copy of *Isis* unveiled, any literary hack could beat it on its own grounds, and in the work whose title heads this note, we notice the same deterioration of his faculties. It is true that he has discovered that the battle of the Alma was fought on a Christmas Day, but otherwise it is entirely humdrum. Its statements may or may not be true, but there is a want of originality about them.

A Russian in the most exclusive court circle at St. Petersburg, discussing the book in our presence, said it was quite as likely that H.I.M. the Emperor would have intrusted the translation of his work to M. Notovitch as that the Divine Providence would have selected him as a medium for the communication of a new revelation.

As the work is now in its third edition in France, and appears to have been received as genuine by a portion of the British press, we have considered it advisable to show cause why it should not be received as historical evidence. F. N. M.

*The Elements of Modern Tactics.* By Lieutenant-Colonel WILKINSON J. SHAW. Eighth edition, revised and corrected. London : Kegan Paul, 1894.

*Catechism on the Manual of Instruction in Army Signalling.* By Major L. EDGE and Major RHODES, D.S.O. Gale and Polden : London and Aldershot, 1894. Price 3s. 6d.

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